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The office of the Railroad Gazette is now at 32 PARK PLACE, New York.

Contributions.

"River Engineers."

TO THE EDITOR OF THE RAILROAD GAZETTE:

We who have never been so fortunate as to have been called to service on river steamers have frequently envied those railroad mechanical officers who have spent a longer or shorter time in "marine service" on the Western rivers, when in club discussions or private conversation these old salts refer to their "marine experience." Frequently at the clubs a member who has had river experience will invoke the testimony of "us who have had experience in marine service" and tell how, when the old engine was groaning and about to stop, "we stood over her and poured oil into the old oil cup, and she walked right off."

It is not my intention to belittle the use of this marine service; the experience was probably valuable. But if marine engineering on the great Western rivers was as far behind the times when those men served as it is now, there is little need to envy them.

Only within a few months injectors have begun to replace the enormous "doctors" which have been used for years to supply the boilers with water, and only a very few injectors are yet in use. That the word enormous is used advisedly may be judged from the following incident: The engines and "doctor" for one of the finest boats recently put into service on the Ohio river were designed by a Cincinnati marine engineer. To guide him in making his designs, the intended dimensions of the space to be given up to the machinery were furnished him. When an attempt was made to place the machinery, it was found that the deck had to be raised a foot or two, and the boat rearranged to make room for the doctor. The doctor is a combination of two steam cylinders, two water cylinders, walking beam, reservoir, valves and many pipes. Near the doctor the "donkey" finds a place. The donkey is a smaller pump, and is used to supply water for extinguishing fires or for washing out the boilers.

The engines of the same boat had cylinders 30 inches in diameter, with 10-ft. stroke of piston. When a "land lubber" remarked that they were large ones, he was answered, "Yes, but they are strong enough; they are three inches thick." The boat made a few trips, and it was found necessary to put in a steel bulkhead to carry the weight of the doctor.

Injectors have recently been attached to the boilers of this boat, but the doctor still remains. When the designer of the machinery heard that injectors were to be attached, he hastened to the owner to learn the truth. When informed that it was a fact, he replied, "Well, I have nothing to say about it, but if you put on injectors my wife will not ride on that boat." There are some wide-awake fellows who favor the injector, but a majority of the engineers object to them, because "they will not supply water against the high pressure carried on the boilers." The steam pressure is usually 180 or 190 pounds.

A cam motion to operate the valves is the universal practice. The valves are set when the engines are built, and are not changed till worn out. The valves are generally set so that steam will be admitted to the cylinder when the piston has moved about 12 in. on the return stroke. The necessity for this, as explained by a marine engineer, is "so that in starting we can make her smarter by raising the cam." It is often necessary to raise the cam by hand to have her start at all. When the cam is raised, steam is admitted at the beginning of the stroke. If the cam were secured in the higher position for the go ahead, it would be so much the worse for the backing position. It is very uncommon to find an engine on these boats that is not using steam at boiler pressure throughout $\frac{3}{4}$ or $\frac{2}{3}$ of the stroke, and exhausting the steam at a pressure of about 100 pounds per square inch.

A company that would furnish these boats with modern, well-designed engines, and take as payment the saving in cost of fuel for a period of years, might make money.

LAND LUBBER.

Cast Iron vs. Forged Soft Steel Brake Shoes.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The remarks of Mr. Chas. T. Schoen, in your paper of June 15th, are interesting to railroad men inasmuch as they have been searching for a long time for something to replace cast iron as a brake shoe medium. Many master mechanics, however, will criticize the statement that soft steel or wrought iron will wear steel tires less than cast iron. The experience of railroad men in many parts of the country has been the other way. The old wrought slippers used on the Illinois Central for many years have been known to wear through the chill of the cast iron wheels, and the experience of the Pullman Company with brake shoes of soft steel has been so discouraging that Mr. Schoen will have his hands full in convincing the Pullman people that a soft steel shoe will be better for their purpose than cast iron. Even the Congdon brake shoe, which is composed of cast iron body with inserts of wrought iron, is a hard shoe for steel tires if the brakes are applied for any length of time, although the wrought iron is prevented from flowing and burning by the particles of cast iron which surround and roll over it.

We have but to look to the experience of the roads in the west for a verification of this fact. The mere fact that wrought iron, or mild steel, wears off in flakes, is against its use as a braking medium for car wheels. These flakes are very thin and are heated to a very high heat by the friction, and weld themselves usually to the brake shoe as they are brought to it by the revolving wheel until a lump of hard turned metal is made which will spoil the tire. [The condition referred to here is illustrated in another column of this issue.—EDITOR.]

I will hazard the opinion, based on observation of several years, that a cast metal will always be preferable to forged metal for brake shoes, and that a metal which will granulate will always be preferred to one which will scale off. When the metal is so hard as to glaze over, as in the case of chilled iron, its usefulness decreases, but there is never danger of the chilled surface cutting the wheel unless especially designed for the purpose. A hard cast steel or hard unchilled iron will be found best for brake shoes by those now engaged in looking up the subject; I mean for all round service.

Another objection to the wrought iron or soft steel shoe is found in the tendency of the metal in both cases to heat and flow on the edges, making fins which become hard and cut the tire, and also from the fact that shoes of these metals change their curvature in cooling and bear on the two ends when the brakes are again applied, increasing the tendency to cut the wheel and always wearing the shoe at the ends. This can be verified by the consideration of the old wrought iron brake shoes which have been used on mountain roads.

As to the retarding power, I have heard it mentioned by some master mechanics that brake shoes of wrought iron glaze over and become exceedingly hard on their face, so that the holding power is much decreased. This will undoubtedly be true of low carbon steel which resembles the wrought iron in nature. With new shoes unaffected thus by heat, a higher co-efficient will undoubtedly be obtained than from any other metal, but we very much fear that this co-efficient will be so high after a long application, as sometimes occurs on the mountain roads, that the shoe will freeze to the wheel instead of the wheel freezing to the shoe. [As illustrated by the shoe already referred to.—EDITOR.]

The co-efficient of friction of soft steel and wrought iron is greater than that of soft cast iron. This fact is indicated by the greater tendency of shoes of these metals to heat and flow. The effect of this rapid heating will be injurious to the wheels and some light may be thrown on this point by the tests made on the Southern Pacific sometime ago, where it was shown that wrought iron shoes cracked against wheels much more frequently than the plain cast shoes, and by the experience of the Colorado Midland, which showed that the shoes containing wrought iron heated the steel tire to such an extent that the steel of the tire was welded to the wrought iron of the brake shoe where the composite shoe was used, but no bad effect resulted on the other end of the axle, where a plain cast shoe was used.

Then again, in the consideration of this brake shoe question, is it not advisable to consider the action of the many railroad master mechanics throughout the country, who, after testing everything, as these industrious and wide-awake men are accustomed to do, have settled upon the plain cast iron shoe as the best for steel tired car wheels, and the Congdon shoe for their chilled wheels, after having tried the wrought iron shoe, the steel shoe and the chilled shoe?

X. Y. Z.

The Traffic Men and the Strike.

CHICAGO, JULY 14, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The strike will not have been wholly an evil if its lessons are well learned. Nor do the truths thus brought to the surface bear upon one side only of the controversy. The wide-spread disturbance, affecting as it has all the roads terminal at Chicago, has brought them for once close

together through the machinery of the General Managers' Association, and the outcome abundantly justifies the existence of this organization.

There are now pending in the west traffic differences which so far have proved irreconcilable simply because some of the officials of the interested lines are unwilling to concede anything of what they conceive to be their rights. Is not now a good time for these officials to come closer together in the spirit of co-operation which has been so abundantly shown throughout the deliberations of their co-workers in other departments?

There is always more harmony among the officials of the operating departments than among those of the traffic departments. The reason for this is obvious. It is the interjecting of official personalities into all discussion of traffic problems which generally defeats any attempt to carry into effect rules and agreements which each member, were he not an employee of a corporation, would frankly admit were just what is needed to bring substantial return to the roads as a whole. The gentlemen connected with the traffic departments are personally, with rare exceptions, good friends and "jolly good fellows," as all know. It is only their zeal to make a good showing for their road that leads them to hesitate to commit themselves to any agreement that may occasionally pinch their own road and to forget that reprisal is sure to follow an attempt to obtain a temporary advantage.

It is almost past comprehension that in the present day and generation men are found who are so wedded to the traditions of the past as to consider it no dishonor to violate their agreements if by so doing they can secure ten or a dozen excursionists. Revive your agreements, gentlemen; carry them out as honestly as you do all your personal obligations, and see if, even though business is depressed, your balance sheets at the end of the year do not warrant the continuation of the agreements.

M. T. R.

The Practical Result of the Locomotive Hammer Blow.

Much has been written and said upon the theory of the locomotive hammer blow, but little has been published giving the actual effect of it upon locomotives, structures and tracks. The theorists have not received encouragement from practical trackmen and mechanics, and therefore have not had the satisfaction of receiving what practical information was available to affirm or contradict their theories.

For the past ten years and possibly longer, there have been practical evidences upon certain railroad lines upon which speeds of 70 miles an hour and over are attained, that imperfectly balanced engines are great track destroyers, and that in extreme cases they make a permanent bend in the rails. These bends are peculiar, and differ entirely from any bend or deflection that could possibly occur by any other force exerted by a locomotive. They are downward and inward. The bent rail in the track shows a downward bend of a half-inch or slightly more, and an inward bend from one-eighth to one-half inch. When these rails are removed from the track, the permanent bend both horizontally and vertically is from six to eighteen inches, measured on an ordinate of the chord between the ends of the rail. These bends have been found at regular intervals equal to the circumference of the driving wheels that made them, and for distances varying from one-quarter of a mile to a mile or more.

In a number of instances, the upward throw of the counter-balances was so great as to throw the drivers alternately clear of the rails, and in descending the wheels did not resume their proper position on the rails but instead the flanges descended on the tops of the heads of the rails, sometimes as far from the gage lines as the centers of the heads. An examination of the driver tires showed that the flanges of the rear drivers alone had been riding the tops of the rails, and the marks on the flanges were all directly under the counter balances.

On one road the number of bent rails removed from the track was very great, and they had to be sent to the rail mill by the car load to be straightened by machinery, as the ordinary rail benders used by the section men could not do the work. The introduction of much heavier rails and more care in counterbalancing for high speeds reduced the number of bent rails, but the bent rails now in the same line of road show that heavy rails, within reasonable limits, will not prevent their being bent in service, neither can it be assumed that the rigidity of the track will prevent the development of the forces that do the damage.

The bends referred to are distinguished as before stated by being downward and inward. The inside spikes, for a distance of about four ties, are moved inward, while the rail has left the corresponding spikes on the opposite side of the rail. The downward bends are best observed by glancing over the surface of the rail. The bends are peculiarly short, both vertically and horizontally.

While these remarks apply particularly to one road as far as they apply to specific details, they apply generally to all roads where extraordinary speeds are attained, and it is believed that a person who can recognize a rail that has been bent by an improperly balanced locomotive, can find them in any track where speeds of over 70 miles per hour are reached. The danger of running improperly balanced engines at high speeds is obvious no matter how perfect the track and bridges. Again, the wear and tear upon a locomotive is extraordinary in broken frames, broken springs, spring hangers, driving wheel centers, etc.

The locomotives known to produce the effects as stated

are generally described as express passenger engines four-wheel connected, 36 and 44 tons, four wheel truck, 68 inch drivers and running speeds reaching 80 miles an hour at times. It is not intended to intimate that no damage to track is done unless rails are permanently bent. On the contrary the same forces which, when developed to their maximum bend rails are developed to a certain extent at all high speeds, and when those speeds are not high enough to make the forces great enough to actually make permanent bends in the rails, they are sufficient to knock the track out of line and surface, and thereby greatly increase the cost of maintenance of way.

Locomotive engineers have been known to report bad places in the track, when actually the jumping of their engines was the only cause for the apparent bad riding of

the side sills and the springs are secured to it by extensions *m*, Fig. 1, of the spring bands. The hook coupler is keyed to a yoke or crosshead *D D*, shown clearly in Fig. 1, from which two rods extend backwards, passing through lugs *pp* in the spring bands, to a similar crosshead *C C*, from which one rod extends to the equalizing bar *B* attached to the spring *R*. The rods between the crossheads *D D* and *C C* are provided with collars *Q Q*, which alternately strike and recede from the lugs on the spring bands as the strains are changed from pulling to pushing, and vice versa; pushing strains will extend the spring *M M* and leave the spring *L L* undisturbed, while pulling strains will extend *L L* and leave *M M* undisturbed. The pushing strains by the hook coupler shown are taken by the buffers, whose rods extend back to the spring *R*, on which

by tenths of a minute. The numbered notches are one minute apart, and are larger than the others. The figures placed opposite indicate the time that known points were passed. By laying a scale of velocities upon the paper, the speed can be directly determined, as the rate of movement of the paper is proportional to the speed of the train. Thus on diagram No. 3, one finds the correct speeds by making use of a scale of velocities for a movement of the paper of 1 foot for 1,000 feet traveled. Similarly on diagram No. 5 a scale is used which is designed for a movement of 2 feet for 10,000 feet traveled.

The line *N N* shows the distance from Paris in Kilometers. On this line are also indicated the stations, the marks being made by hand.

The line *V V* shows the velocity of the wind, with

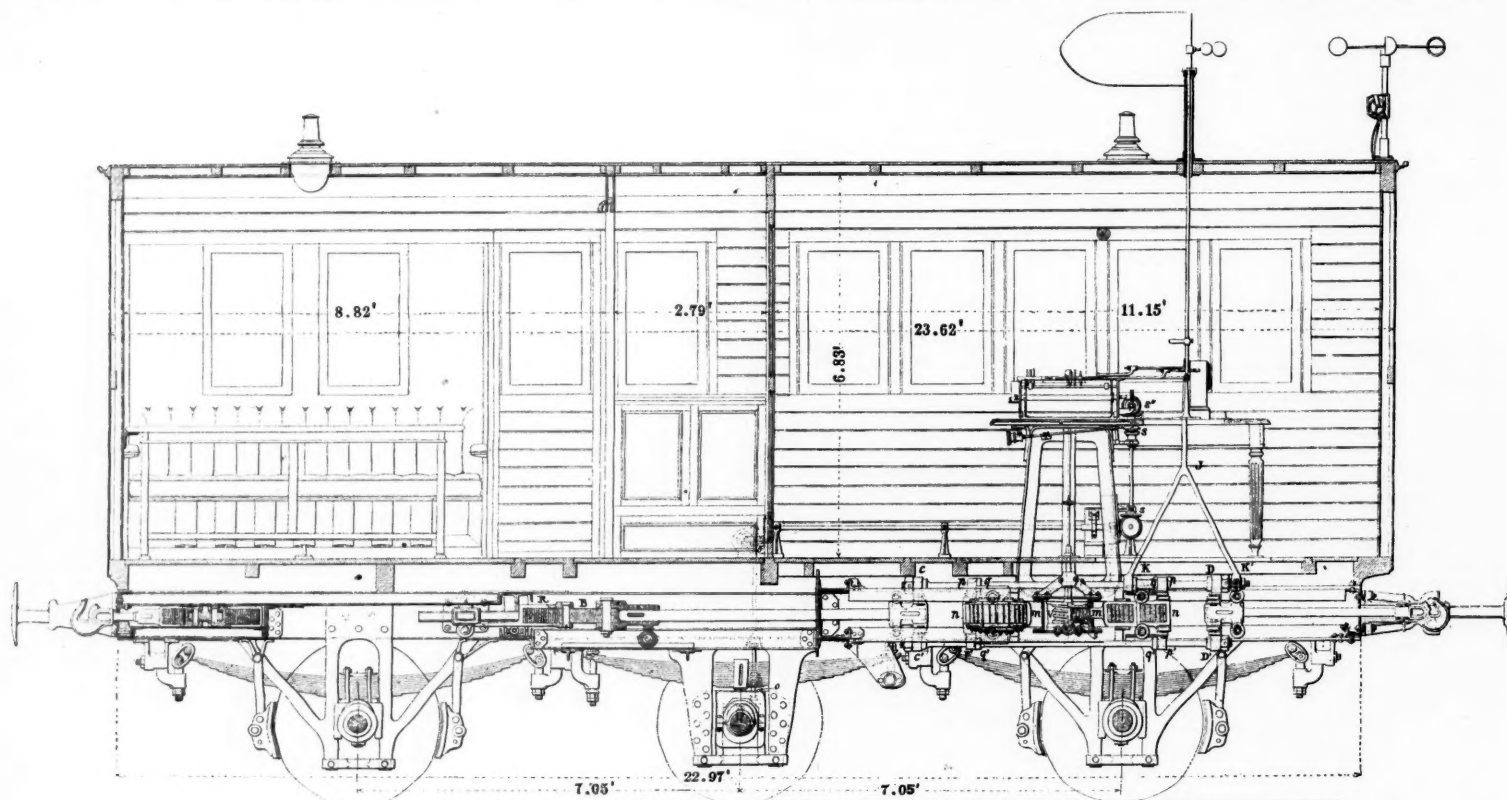


Fig. 1.

the track. With the increased demand for high speeds, locomotives will have to be designed that are perfectly balanced. The limit of safe speed with unbalanced engines has been reached and passed. As a matter of economy in track and motive power repairs alone, the perfectly balanced locomotive is a necessity upon high speed lines.

HEADLIGHT.

A French Dynamometer Car.

The Paris, Lyons & Mediterranean Railroad built several years ago two dynamometer cars of the design shown in the accompanying illustrations from the *Revue Générale*

a certain strain is put when the cars are coupled up. This spring simply furnishes the buffer pressure which is customary on European cars. A limit to its compression is reached when the blocks on the buffer rods strike the ends of the equalizer *B*, just ahead of the spring. The tension of this spring in no way affects the reading of the dynamometer record as the compression strain on the buffers is neutralized by the tension it occasions between the couplers. The dynamometer springs therefore record the pull and push correctly, notwithstanding the presence of other forces, because these latter neutralize each other. All moving rods are guided by rollers to reduce friction. The record from the springs is obtained by the inverted

respect to the train, the notches being made by a pencil which the anemometer works electrically, giving an electric contact for a certain displacement of air. By measuring on this line the time corresponding to the number of seconds which separates two successive notches, one deduces therefrom the relative velocity of the wind with reference to the train. Thus between the two notches *A* and *B* (diagram No. 3) one finds a displacement of air corresponding to a wind velocity of 18 miles per hour.

As to the relative direction of the wind the angle that it makes with the axis of the train is given by the marks of two pencils, one of which shows the sine of this angle and is mounted at a distance of about 2 inches in front of the

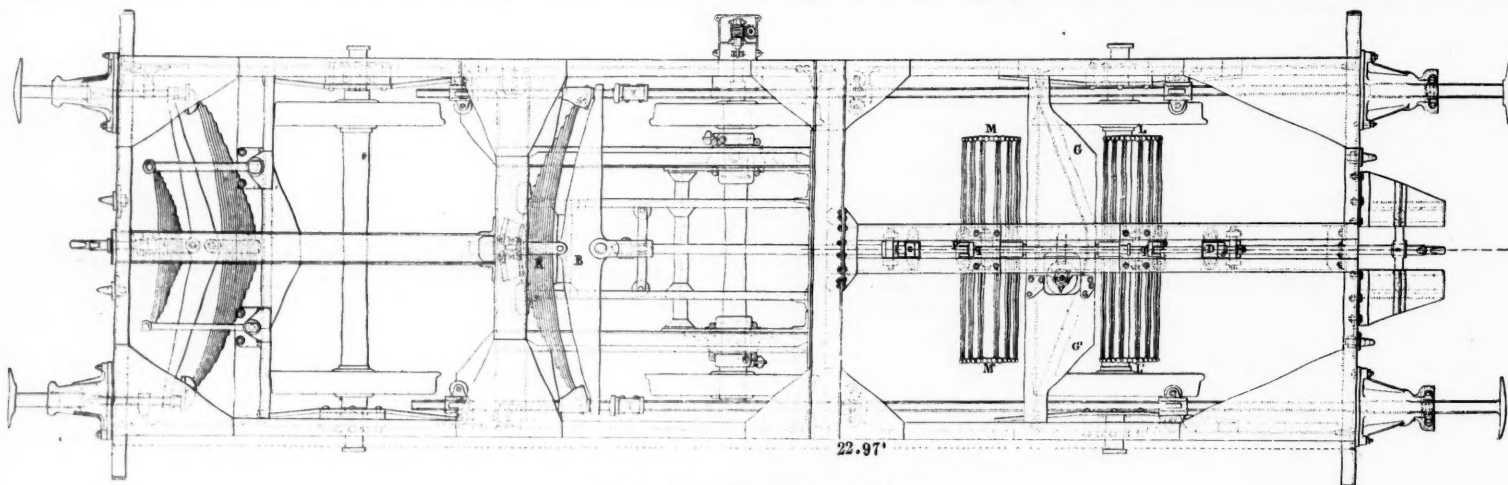


Fig. 2.—A French Dynamometer Car.

des Chemins de Fer. They were constructed for the purpose of making comparative tests of anti-frictional qualities of different oils and journal bearing metals, a train being made up with a dynamometer car next to the engine and one in the middle of the train, the first half of the train being lubricated with one kind of oil and the rear half with another; or the oils were the same, and the bearing metals varied as desired.

One end of the car has the draft gear and buffers commonly used on that railroad. The end from which the records are obtained is fitted with the usual hook coupler and buffers, but the gear to which they are attached is necessarily modified. The dynamometer springs are *M M* and *L L*. The heavy built up beam *G*, Fig. 2, is fastened to

Y-like frame *K J K*, the upper end of which is attached to the pencil mechanism. The paper drums and mechanism are mounted on a table, as shown. The motion of the paper is obtained from the middle axle by a worm, see Fig. 2, rotating with it. Long shafts and bevel gearing transmit the motion to the mechanism on the table. Diagrams of 18 inches in height can be recorded by this machine.

Through the courtesy of Mr. M. E. Chabal, Engineer-in-Chief of this road, we are enabled to present diagrams taken from one of these cars which will doubtless add to the interest of the description, and show more clearly the manner in which the required information is recorded.

In these diagrams the line *M M* gives the time marked

pen which records the traction force, while the other shows the cosine of this angle and is mounted at a distance of about 1 1/2 inches in front of the same point. In order to determine the relative angle of the wind with the road it is only necessary to apply a scale of sines or cosines at the proper point on the diagram. For angles greater than 45 degrees the scale of cosines is used, while for angles less than 45 degrees the scale of sines is used.

Diagram No. 3 relates to the stop of an express train at Dijon station, and shows between *A* and *B* an average speed of 64.6 miles per hour, the engine drawing the train with an average pull of 1,984 pounds on the draw bar. At *B* the throttle is closed. The rolling resistance of the train being less than that of the engine the train pushes on the

engine from B to C with an average strain of 945 pounds. At C the brake is set. The action of the brake makes itself felt first on the engine and tender, which act during a very short time by holding back the train and produce a compression of 2,200 pounds at D. As the brake pressure runs back over the train, which is more strongly braked than the engine, the train again holds back the engine with a pull upon the draw bar increasing until at E, where

The reaction of the draw bar springs momentarily put a tension of 2,500 pounds on the draw bar, then the train draws on the engine with a stress of 450 pounds. The brakes are set at O and released at P, the train coming to a stop.

On leaving the side track from Q, the draw bar pull is quite high until at R, where the throttle is closed while passing the station. At S the small throttle is opened,

Manning's Double Life Rail.

Mr. W. T. Manning, Chief Engineer of the Baltimore & Ohio Railroad, has recently secured a patent for a design of rail which he calls the "Manning Improved Double Life Rail, Interchangeable." The idea will be grasped at once from the engraving. The section inside of the dotted line shown may be any section preferred by the designer and

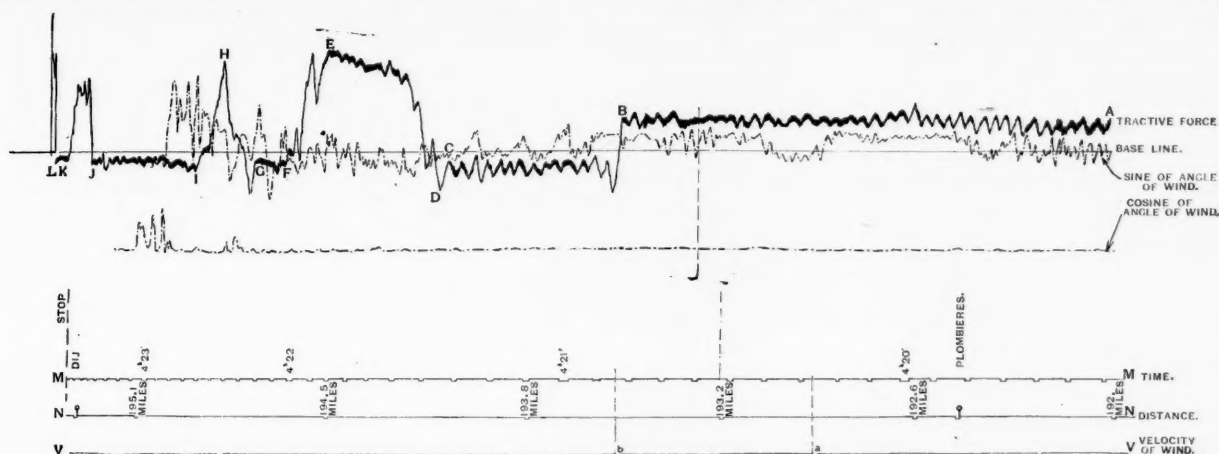


Diagram No. 3.

it is 6,400 pounds. From E to F brakes are released, in consequence of which from F to G the train again commences to push the engine. From G to H are made new applications of the brake, increasing the strains on the draw bar to 5,650 pounds. At H the brakes are again released, and consequently from I to J the train again pushes the engine. At J is made another application of the brake which is soon released, and still another appli-

and at T the large throttle also, the pull then amounting to about 7,800 pounds and slowly decreasing as the speed increased.

The travel of the paper on diagram No. 5 was somewhat more rapid, being about 9.6 feet in 10,000 feet. This was taken on a passenger train and indicator cards taken at the same time, the object being to show more exactly the ratio between work done in the cylinders and at the draw

that portion of the head, as well as the web and flange, is symmetrical to the central vertical axis. Mr. Manning's improvement consists in making the rail head unsymmetrical by putting on additional metal, as shown outside the dotted line. He says that the object is to provide a rail of the standard type which shall be capable of service in main track for a materially greater period than the rail of ordinary construction, without any substantial increase of

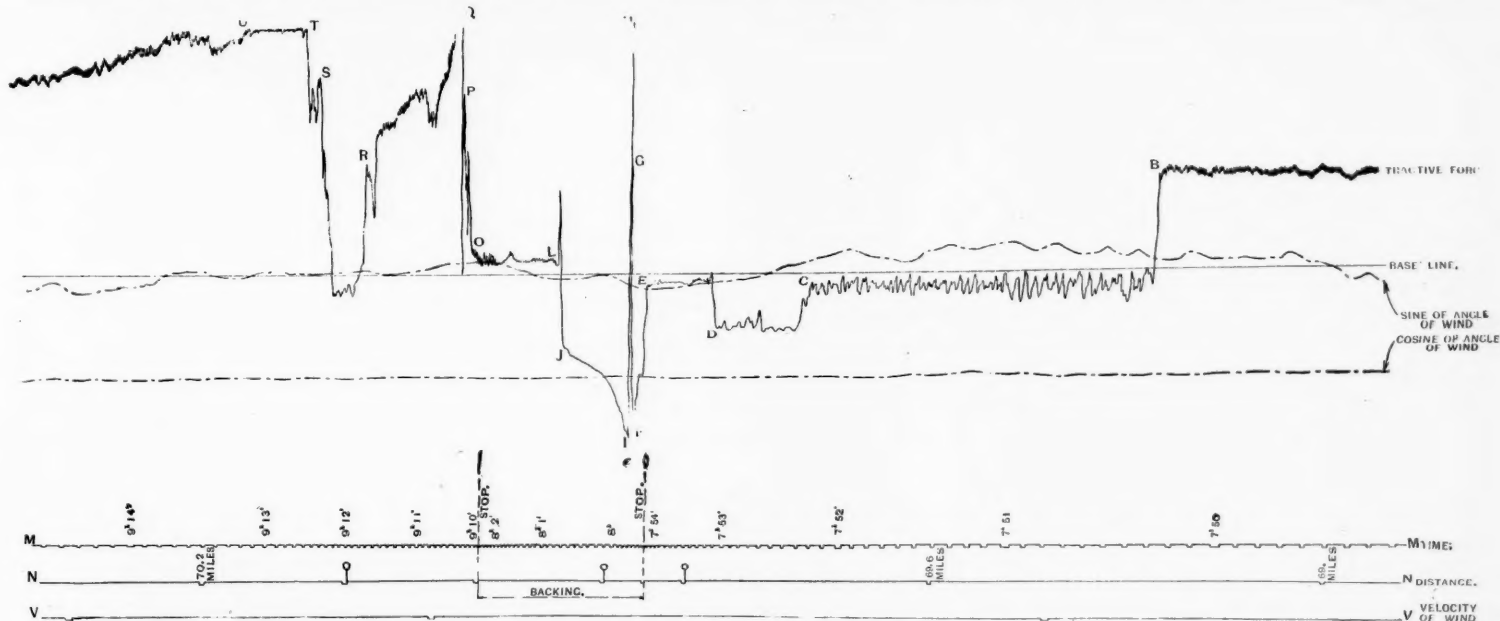


Diagram No. 4.

cation made at L, when the pull on the draw bar runs up to about 13,250 pounds at the instant of stopping.

Diagram No. 4 was taken with a freight train weighing 662 tons or 1,324,000 pounds. The run from A to B was made at an average speed of 22 miles per hour with an average pull on the draw bar of 3,100 pounds. At B the throttle is closed, the train pushes the engine with a force of 400 pounds. From C to D brakes are applied and act more strongly on the tender than on the remainder of the train, causing a compression of 1,550 pounds at the draw bar. At D the tender brakes are released until E is

bar of the engine. The instruments in this case were connected at A and disconnected at B. The pull between these points averages 3,100 pounds.

It is interesting to notice that the waves on the traction line are due to the changes in tractive power of the engine during each revolution of the drivers. Thus for a distance C D of 328 feet, we find about 16 revolutions corresponding to a distance of about 16x20.5 feet=328 feet. The engine drivers are 78 1/4 inches in diameter. The waves in the traction line upon each of these diagrams have the same signification, but on diagrams No. 3 and 4 are more

cost or dimensions, or departure from the general form and proportions. We present the design without pretending to pass any judgment on its merits.

His argument is that under ordinary conditions, that is to say, on portions of a railroad not having exceptionally heavy grades involving the free use of sand, the rail wear is due almost entirely to the friction of the wheel flanges on the side of the head of the rail, the wear of the top of the rail being comparatively small. When the running side is considerably worn the rail becomes unfit for further use in main track and is either condemned or put into

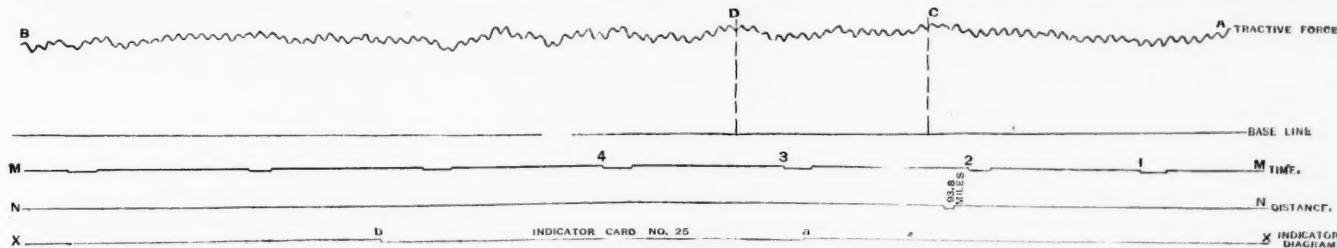


Diagram No. 5.

reached, where a new application of the brakes produces a compressive strain increasing to 4,850 pounds at F, then stopping the train with a reaction producing at G a pulling strain of 3,300 pounds. It being necessary to do some shunting at this point, the engine first made a turn forward, bringing the draw bar pull up to the point H, representing 7,700 pounds and the backed for distance, the compressive stress at first amounting to 5,200 pounds at I, and gradually diminishing to J, where the throttle is closed.

run together on account of the movement of the paper being slower.

The line X X, which ordinarily registers the force of the wind serves also in this case to mark by electric contact from the cylinders, the exact point at which indicator cards are taken, thus enabling the card to be compared with the work utilized at the draw bar. The long notch between a and b shows the point at which indicator card No. 25 was taken.

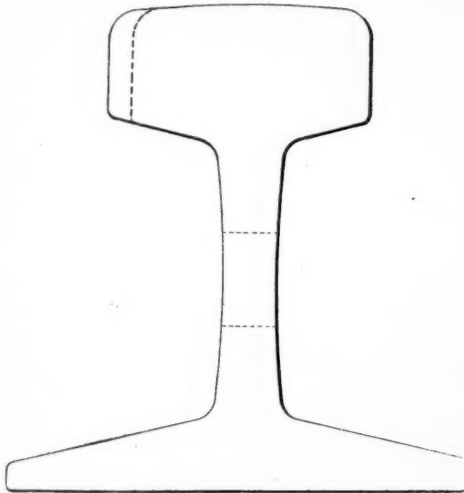
sidings, but the web and flange are still in good condition. It is proposed, therefore, to provide a rail which after giving the service usually rendered by the ordinary rail may be reversed, so as to make the other side of the head the running side, presenting then a section of substantially the same form and dimensions as those of the present rail when new, thus practically doubling the useful life of the rail. Of course, instead of turning the worn rail end for end the two rails may be shifted from side to

side in the track, thus bringing the unworn side of the head into bearing.

A further advantage is that when laid on curves the reinforced side of the rail may be put on the inside for the high rail and on the outside for the low rail, thus curving both rails alike. It is thought that this rail will show special advantages on railroads of much curvature, and that in such places, when handled by an intelligent road-master, it will give at least three times the ordinary life of the rail. Mr. Manning has had 10 years of experience on one of the hardest divisions of the Baltimore & Ohio, that is, the Pittsburg Division, and the ideas represented by this improved section are the result of that experience.

After considering Mr. Manning's proposed section and his arguments for it several questions occurred to us which Mr. Manning answered at some length.

(1) How large a percentage of rails taken out of track as being worn out are taken out because the metal on the side of the head has been worn off by the wheel flanges? Is



Manning's Double Life Rail.

it not a fact that such renewals would be an extremely small percentage, and is it not true that the batter of the ends or the wear in spots near the joints is the ruling consideration in renewing rails? To this the answer is that on such roads as the Baltimore & Ohio, Chesapeake & Ohio, Lehigh Valley, mountain divisions of the Pennsylvania, and other roads of much curvature, the percentage of rails worn out by flange wear is a very serious item in maintenance. In fact the high rail on a curve is often replaced several times while the original one remains undisturbed.

(2) When rails are taken out for such wear is it not a fact that the flow of metal towards the outside of the head has made a fin which would make very rough riding if the rail was turned around to bring that fin on the gage side? The answer to this is that such a fin is only produced after many years of wear, or, in other words, after the rail has lived its useful life. In laying rails as proposed the road-master would use proper judgment and turn them at the end of three or four years on ordinary curves, and perhaps at the end of two years on very heavy curves, by which time the rail would have been worn to something near the standard section. The exchange of rails from the low side to the high side, and vice versa, is a matter of almost every day occurrence, and when proper care is taken and the rail not used too long before such change little trouble is found from fins.

(3.) If it is advantageous to increase the width of the head on one side so as to give extra metal for flange wear, why not increase it on both sides and make the rail symmetrical, and so instead of having a double life rail have one of quadruple life? We will quote Mr. Manning's answer to this in full: "I can best answer this question by referring to yours in connection with the fin as the extreme width of the rail on the high side of a curve being worn to a bevel must necessarily increase the high ridge or fin seen upon the outside of a much worn rail. In addition to the above I do not think it possible to make a quadruple wearing rail, from the fact that by the time the life of the rail I propose is done the flange and the top wear of the rail will have deteriorated to such an extent as to not make it a very good main track rail. In addition to the above it would add about three tons per mile to the rail without any material benefit, and would therefore only be a waste of money."

In view of the tendency to heavier rails and of the probability that 100 lbs. will soon be standard on main lines, it is believed that such an improvement as is suggested here will become of still greater importance from the fact that the flange and web necessarily being heavier will make the loss in scraped material so much the greater. It is believed that there is no question as to the utility of such an increase of metal on one side on roads of heavy curvature, but it is not plain that on tangents there will be great gain.

While we are still not at all convinced of the gain in making the head unsymmetrical, we feel bound to respect the opinion of a man of as large experience as Mr. Manning has, and are glad to bring his idea to the attention of rail makers and maintenance of way engineers, being sure that he will welcome fair discussion of it.

Brake Shoes and Steel Tires.

The action of some classes of brake shoes on steel tires is shown by the illustrations. The cuts are made from photographs of a brake shoe that was applied to a steel tired wheel of a passenger car at the top of a grade on the Atchison, Topeka & Santa Fe, and shows the effect of one run to the foot of the hill. In g. 1 is shown the brake shoe



Fig. 1.

shoe extending from the dark spot near the center to the upper left corner; the detached piece of tire was welded at the dark spot near the middle of the tire, but it was broken off in handling. The surfaces shown in fig. 1 are those that were next to the tire.

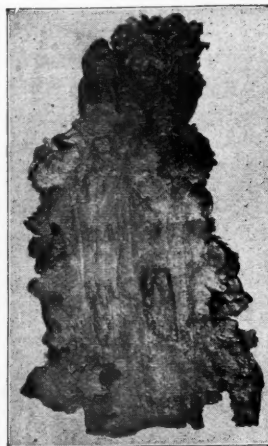


Fig. 2.

The detached piece is shown on an enlarged scale in fig. 2. This shows clearly that the piece is not one thin fragment of tire but is an accumulation of small pieces at the top of the shoe. They are of a bluish color, showing that they have been heated very hot. Some tests were made about three years ago with some of the same class of brake shoes (that is, with pieces inserted in the face), applied to a steel tired wheel, mounted in a shop, where the action of the shoe on the steel tire could be observed; the wheel was rotated by a belt from line shafting. It was observed that the particles of tire and wrought iron, the latter from the pieces forming a part of the shoe, would collect at the next wrought iron piece and would become heated to a white heat and soon break away, to lodge again at the next inset; and so on till there was a continual stream of sparks flying from one end to the other of the shoe. The pieces would weld permanently to the end inset. Judging from the appearance of the piece attached to the shoe from which the photographs were taken, this is the manner in which the tire was worn by the brake shoe on the Santa Fe wheel.

Some Personal Experiences of the Johnstown Flood.

On the second of June Mr. Joseph T. Richards, M. Am. Soc. C. E., Engineer of Maintenance of Way, Pennsylvania Railroad, delivered before the Engineers' Club of Philadelphia an address on the Rebuilding of the Pennsylvania Railroad After the Johnstown Flood. The story of the remarkably able way in which the Pennsylvania Railroad met this tremendous emergency has never been completely written and it probably never will be, but we are glad to be able to give Mr. Richards' address as an important and interesting contribution to the volume of experiences which some one may some day undertake to collect.

In speaking on the subject of rebuilding the Pennsylvania Railroad after the June flood of 1889, we will first get the date correct as it did not occur in June, but on the 30th and 31st of May.

I have consented to open this subject with much reluctance and do so with no intention of presenting to this Club a pamphlet on surveys or location; nor of bridge building, or what might be called a treatise on railroad construction; it is my purpose to tell a story of the flood.

A trouble such as this flood, generally begins with a telegram giving word of a heavy rainfall; such messages continue, and there is anxiety for the safety of trains and road-bed; then damage is reported. Officers collect, and remain on duty at telegraph offices night and day, communicating with employees along the lines. The organization begins to feel that it is to be tested to prevent loss of life and repairing its torn up railroad.

We all remember this June flood, as it is called. The destruction was simply appalling. It is enough to say that no writer of that day was able to describe, nor was there found an artist who could portray the destruction which came. The storm was of a very general character. It formed in Kansas and Nebraska on May 28th, moved eastward, and developed in Pennsylvania on the afternoon of

May 30th, when flooding rains commenced in the vicinity of Johnstown, gradually extending over the entire State as far east as Lancaster, and continued almost without cessation for a long period of 24 to 36 hours. During these periods from four to eight inches of rain fell in localities which were below the general level, and from which it is evident that a greater quantity must have fallen on higher districts and mountain ranges. This vast amount of rain falling on an area of over 12,000 square miles, caused the most destructive flood known in the history of the country.

Beginning with my personal experience; on the 31st of May I was, during the greater part of the day, with three companions driving across the country for professional observations between Middletown and Hummelstown near Harrisburg, Pa., where the water gage registered a rainfall of 8.2-10 inches. Returning to Philadelphia late in the night, I started west from Broad Street Station early in the morning of June 1st, with Mr. Frank Thomson, First Vice-President, under his directions to repair our losses. Before arriving at Harrisburg we found the tracks under water for almost 1½ miles between Steelton and Harrisburg. Without delay, however, we managed to get our train through, the water being over the boxes of the car wheels.

Finding the water was still rising we stopped at Harrisburg Station to learn the situation and make arrangements for the emergency. Here I wish to give you somewhat in detail, and I would not do so except as an example to show what we actually did, from what our minds at that stage of the flood told us was prudent to be done, cut off as we were from almost all parts of the State, and judging everything at short range; and in this is the lesson, if I have one, to lay before this learned body of gentlemen as to where the engineering comes into the story, and allow you to draw your own conclusions and to form your criticisms.

Immediately we started to prepare a complete outfit to work, feed and camp the carpenters, telegraph linemen, laborers, etc., using what we might find about us as available. We changed two baggage cars into kitchen cars, purchasing and placing a cook-stove at each end, making tables and benches for the conveniences of the cooks, and laying in a large supply of provisions.

We purchased a supply of table and cooking utensils for a pretty strong commissary department, at the same time taking the seats out of the passenger cars and making a table of pine boards the full length and down the middle of each car, placing one of these cars at each end of a double kitchen car. This formed one of two sets of kitchen and dining cars for the commissary train. A second equipment of this kind was ordered to follow, which was promptly made and came on after we had left Harrisburg. Day coaches were taken along, with two blankets for each man, for temporary sleeping accommodations.

We also arranged one car loaded with tools and materials for carpenters and trackmen, such as two or three coils of 1-in. and 1½ in. rope, 1,000 feet each, about fifty kegs of 6-in. and 8-in. cut and boat spikes for bracing and scaffolding use; additions to the carpenters' tools, as they were found to be short, and to supply what additional carpenters we would be likely to pick up without tools; several car loads of 3-in. plank, and 12 in. x 12 in. or 10 in. x 10 in. lumber, which applies so well for trestling, and as much of our standard stringer sizes as could be found was purchased and arranged for to follow us.

In the search of further light at this dark hour, Mr. Thomson's vigilance succeeded in finding an electric car on the Cumberland Valley Railroad, fully equipped with generators, wires, etc. This car was manned and taken along and proved to be of great service to turn darkness into light at the Montgomery bridge, and afterwards at the viaduct on the Pittsburg Division.

During all this preparation at Harrisburg for materials, tools and commissary department, the water was rising rapidly in the Susquehanna river, and I was suddenly informed by Mr. Thomson, who was managing the line where it could be reached by telegraph, that a passenger train had stuck in the high water between Harrisburg Station and Steelton. By his directions I immediately started eastward to relieve it; first by an engine, but was only able to go a short distance, then securing a boat, and after proceeding about 1½ miles down the track, it was reached. The trainmen had proved their value in an emergency by securing a large float of logs and boards, and with this landed the passengers in safety a few hundred feet to the shore, excepting, however, the express messenger, who had valuables in his iron box and was guarding it in the car. I conveyed him, with the iron box, in our boat to Harrisburg Station. When we left the train the water was level with the floor of the express car.

The water after this rose rapidly, and there was as much as six miles of our track under water, beginning a few hundred feet east of the train shed at Harrisburg and extending eastward.

On the night of June 1st we remained in the station; at 5 a. m. on June 2d, we started with our trains westward, and after spending some time watching the Susquehanna river and bridge at Rockville, proceeded up the Northern Central and Philadelphia & Erie Railroads, reaching Sunbury at 10 a. m.

The difficulty in working in so swift water at this depth can be better imagined when it is understood that an inch gas pipe was repeatedly broken off by the current in our effort to get the depth by forcing it to the bottom, and when we made the soundings for the first trestle, it was by tying two bars of pig lead together and by making a strong cable of twisted telegraph wire, bracing it to the water

line. We thus succeeded in getting to the bottom; not in a straight line, of course, but by making allowance, it proved reasonably satisfactory to get the proper lengths for the legs of our trestle bents. The bottom of the river was found to be so rocky and uneven that it was necessary to make soundings for each leg of a bent, so as to fit the bottom, and make it well enough located to carry the heavy trains. We thus found it a most difficult undertaking; besides, we had no labor or material within reach of the north end of the bridge, and but a single track, and no sidings at the end at which we were working, upon which to shift trains or receive the material we were bringing for the hurried undertaking. On June 4th, the second day of our forces being at the bridge, we were not able to get the first bent in place, upon which we spiked 2½ tons of old railroad iron to sink it through the current to the bottom. We had placed our electric car immediately at the south end of the bridge and extended the wires so as to give us light during the night.

During those first two days we laid nearly two miles of additional track and sidings, with switches for receiving the large amount of material and shifting cars which had to go back and forth. We had also succeeded in getting a large number of boats and as soon as the river could be crossed by boatmen, started a method of hauling framed material in wagons about three-fourths of a mile up stream, nailing together a raft at the water's edge and boating it across with a heavy force of boatmen to reach the other side, so as to be able to work from both ends.

The day following, June 5th, the water had fallen until it was 17 ft. deep, and we were successful in adding to our fleet a small steam ferry boat, discovered in the dam at Northumberland, which assisted us very much in ferrying the framed stuff across the river to the north, at which time we divided our carpenter force and worked from both ends and can be said to have been fairly under way at this time, daylight of June 5th.

The total length of the bridge of eight spans is 1,242' 5½". About 1,000 ft. had to be trestled—800' continuous, 200' in part.

This work was completed and the first train passed over about dusk on Saturday, June 8th. The time of raising the bridge was June 5th at 8 p. m., to June 8th, 3½ days; progress made about 300 feet per day.

I would further state, in relation to this, that our standard P. R. R. trestles, with wooden stringers, are usually limited to 12½ ft. span, but these trestle bents were placed 15 feet apart, although constructed without a sill. Upon this was turned the very heavy traffic of all main line trains of the P. R. R. which first opened out through this as the only channel, and continued under almost a constant roll of wheels for some weeks until the Juniata bridges were built between Tyrone and Harrisburg, and continued quite satisfactory until an iron bridge was ordered.

The 15 feet for a span was decided upon to save time, but not until after a serious consideration, and investigation as to the nature of the river bottom.

The washed out spans were 158 feet in length, a 12 ft. span would have taken 12 bents for one opening, a 15 ft. span would take but nine bents for one opening.

We thus saved three bents per one old span of the bridge and opened the road for traffic more than one day earlier by adopting the long span method.

In a very short time after the traffic was opened, our carpenters had all their tools loaded, and such material as we thought would be worth taking along to be used elsewhere, and we were assembled ready to move westward, which we did, under directions of Mr. Thomson, who had passed on the day previous to Altoona. Leaving Montgomery bridge about 10 o'clock that night, we arrived at Tyrone the following morning (Sunday, June 9th), where I received orders to proceed with the entire force to the Pittsburgh Division. Arriving at South Fork and the Viaduct in the flooded district along the Conemaugh valley, we there joined Mr. T. N. Ely's shop force in the reconstruction, and continued until meeting the west of Pittsburgh forces under Mr. James McCrea, General Manager, at the trestling of Bridge 6. The western force had rendered us valuable aid by coming from that much isolated end of our P. R. R. Division and constructing the trestle work at Johnstown and also at Buttermilk Falls, and at Bridge 6, laying the washed away tracks about Conemaugh and opening the road west of Bridge 6.

The flood in the Conemaugh valley was found to be of the most serious nature, and as I was left as the field officer in charge of reconstructing the railroad from Johnstown to South Fork for the following two months and a half, I had not the time to preserve as extensive notes and data as I would wish to present here to form a complete history. I will add, however, such items as may occur to me or be found in my note book.

I would call attention to the several dams which were made in the flood as it passed down this valley. First, at the loop (of 14-10 miles) at the Viaduct, where, from the crooked line of the stream, the narrow hills and the Viaduct Bridge and embankment, the flood was not able to pass as rapidly as it had at other places, and consequently dammed up to the depth of about 90 feet above the ordinary low water level. Other smaller dams occurred at different points until it reached a similar loop in the river (of 11 2-10 miles) at Bridge 6. Here it dammed to a depth of about 40 feet, and after breaking away swept down the valley with increased weight of water and force, striking the villages of East Conemaugh, Franklin, Woodvale, West Conemaugh and Johnstown, and finally ending its force against the seven span stone arch bridge recently constructed by our Railroad Company at Johnstown.

The lineal feet of track which we lost in the four running tracks eliminating sidings and yards at Conemaugh and elsewhere, were slightly over 20 miles between South Fork and Johnstown bridge. This amount of rail was entirely destroyed and had to be replaced by new rail. Not only was the track and road bed washed away, but the rails were bent, broken and a large percentage lost. The embankments were torn away almost completely from South Fork to Viaduct, a distance of 1½ miles, and at the Big Wash near Bridge 6, where the river reclaimed its old bed, we were compelled at a great expense to put the river back to its former position, making a four track bank 14 ft. to 16 ft. in height for about one mile.

At Buttermilk Falls the four track embankment was completely washed away, and after a temporary trestle was constructed for the opening of the railroad, it was filled in by dredged material and shovel plowed from flat cars. The tracks at Conemaugh and Woodvale were completely swept away, but the grading was comparatively light and of sand filling except in the neighborhood of the Conemaugh round house, where the embankment was washed away and had to be replaced by filling 6 ft. to 12 ft. in depth. At the bluff east of Johnstown about 1,000 feet of four track embankment was washed away and a height of about 16 feet had to be replaced. At the east end of Johnstown bridge about 1,000 lineal feet of four track embankment was washed away, height about 18 feet and was filled in.

Thus the work progressed until June 14th, just a fortnight after the flood, direct communication was established via the Main Line from Philadelphia to Pittsburgh, and nearly all passenger schedules were reestablished and movement of freight traffic resumed with reasonable regularity. At the end of five weeks from May 31st (the day of the flood), all this two and four track system of railroad was reconstructed and opened for traffic with as many tracks as we had before the flood, excepting, of course, single track gauntlets across high bridges and trestles. All of these were replaced with three track stone arch bridges as rapidly as practicable during this year. A history of these would be interesting, particularly Bridge 6 and the Viaduct.

As to the damage in the valley, I would only say a few words. The reservoir at South Fork at an elevation of about 1,700 ft. above sea level giving away about 3 p. m., May 31st, caused a great amount of water to flow down a narrow valley, falling about 53 feet to the mile. This lake had an area of about 400 acres, which, at its normal level of 60 feet in depth at the breast, contained 3,000,000,000 gallons or 400,000,000 cubic feet of water. The weight of this would be about 11,000,000 long tons. The flood increased the depth to 70 feet at the dam breast, and the quantity of water to about 5,000,000,000 gallons or 666,700,000 cubic feet, weighing in round figures 18,000,000 long tons. The flood down this valley averaged about 27 feet in depth above ordinary low water. It would seem that this depth of water would not cause so very much damage; and when it is compared with other floods, as follows: The Susquehanna river, a body of water very many times as large, which at this flood was at Williamsport 34 feet above its ordinary level; and the Juniata river east of the Alleghenies, a stream carrying much more water than this, notwithstanding the flood was 23 feet above its ordinary level; and with the Monongahela river, which has of late years had floods to 33 feet above its ordinary level; the cause of so much damage in the Conemaugh Valley must be looked for in some other direction than the quantity of water and the height of the flood. The fall of the Conemaugh river is 53 feet per mile. The fall of the Juniata river is about six feet per mile. The fall of the Susquehanna river is, past Williamsport, very slight indeed, from 1 7-10 feet to 2 4-10 feet per mile, as also is the Monongahela river, and in this great difference may be found the correct cause of the damage. If a large lake of water is suddenly turned out and reaches a comparatively level and large area, it will soon spend its force and do but little damage; but take the same quantity of water weighing 18,000,000 tons, and start it down a narrow gorge or valley falling 53 feet per mile, and at the rate of a mile in four minutes, it can be very easily understood without further detail, that so great a falling weight must cause much damage to whatever it comes in contact with in opposition to its course.

An Improved Car Door Bracket.

The illustration shows a car door bracket lately brought out by the Chicago Grain Door Company which has considerable merit. It is well known that a car fitted with the common form of door brackets, can easily be entered without disturbing the seal by removing the lug screws or bolts, taking the brackets off and prying the lower rear corner away from the door post.

The bracket shown is of the usual form, though somewhat wider than usual and is provided with lugs which engage with the square sides of the head of a lug screw which is used in the lower hole. In putting on the brackets it is necessary to put in the lug screw first and turn the bracket with the screw the last turn or two. When seated, the through bolts are put in the usual manner.

Even without the through bolts it is impossible to remove the bracket when the door is closed, as its width is, so great that considerable clearance would be required to



turn the bracket and so remove the screw. The screw could not otherwise be removed except by chipping away the lugs or breaking off the head of the screw.

Another form of the device provides a square hole intended to take a special lag screw with square shoulders.

The Railroad Branch of the Young Men's Christian Association.

BY GEORGE A. WARBURTON.

[We have often been struck by the admirable arrangements for the comfort and convenience of railroad men made at various points by the railroad branch of the Young Men's Christian Association. We regard the rooms established by this institution as being most valuable from a moral and from a purely business standpoint, quite apart from any strictly religious influence that they may have. They provide places where men may bathe, sleep, read, talk and sometimes get cheap refreshments. These places are clean and orderly and always attractive to decent men. They help to keep the men from saloons and from loafing around dirty taverns during the hours when they are off duty, and enable them to get reasonable rest and diversion. Therefore we thought that a little account of the origin and organization of this work would be interesting to enlightened managers and have asked Mr. George A. Warburton, Secretary of the New York branch, to prepare such an account.]

In the year 1867 the Young Men's Christian Association sent a man out to work along the line of the Union Pacific Railway, which he did, chiefly among the employees of that company; but the real beginning of the railroad branch was in 1872 in the city of Cleveland, O. There a religious service, especially for railroad men and their families, was started in the waiting room of a station, one of the clergymen of the city having been asked to preach. These services were kept up with considerable interest until it was felt that the work should be made more permanent and developed along the same lines as those which had proven successful among the young men of the city engaged in other pursuits. Then was formed the first Railroad Branch of the Young Men's Christian Association with its reading rooms and other attractions for the men running into that station, in charge of a secretary.

According to the last "Year Book" there are now 96 branches in the United States and two in Canada, and the membership has reached 23,302, while the cost of maintenance for 1893 was \$184,934. The rooms of these organizations are usually located at terminal points where large numbers of trainmen congregate. The controlling ideas in the location of rooms are, readiness of access to men in the train service, and convenience to the section of the town where the largest number of railroad employees live, in order that their families may share the social advantages and pleasures. Location on railroad property is preferable, unless the ground is owned by the Association itself, because such location forms an additional bond between the companies and the employees and stamps as distinctive the work which is done. Some associations have been successful at points where the shops of the companies have been located, and in such cases, as the number of men employed in the movement of traffic has been small, the location of the rooms or buildings has been made with reference to the demands of the larger class. As a general rule, however, the association has found the greatest demand for its effort as well as the most satisfactory results, among the employees of the operating department.

The plan of organization has usually been about as follows: The Railroad Secretary of the International Committee of the associations, at the request of the General Manager of the company upon whose lines it is proposed to form an association, visits either a single point which is considered the most needy and available, or the different termini of the entire system, consulting with the superintendents and subordinate officials, and through them securing information concerning the number and character of the employees likely to be benefited by the proposed work, the probable attitude of such employees toward the movement, the location of available rooms or buildings on or near the company's property which could be utilized as headquarters, the cost of fitting up such headquarters, and the amount of the annual appropriation which the company would be asked to make.

As a rule, copies of a petition requesting the companies to assist in the establishment of a railroad branch, are placed in the hands of the employees and the list of names thus secured forms a basis of membership when the organization is perfected. The managing committee is composed of railroad men and is appointed by the President of the Young Men's Christian Association. It is sometimes found that a railroad corporation is unwilling to commit itself to the support of the association at all the points upon its lines which offer opportunities for the establishment of branches, without first having tried the experiment at a single important station. While it is true that in every case where the association has been thus tested, further extension has invariably followed, it can be readily seen that the good effects of an association at one end of a division upon the men might be neutralized by the absence of such provisions for their needs at the other terminal points. It is far better that the whole system, and its entire force of men, should be brought into contact with the elevating influences of the association.

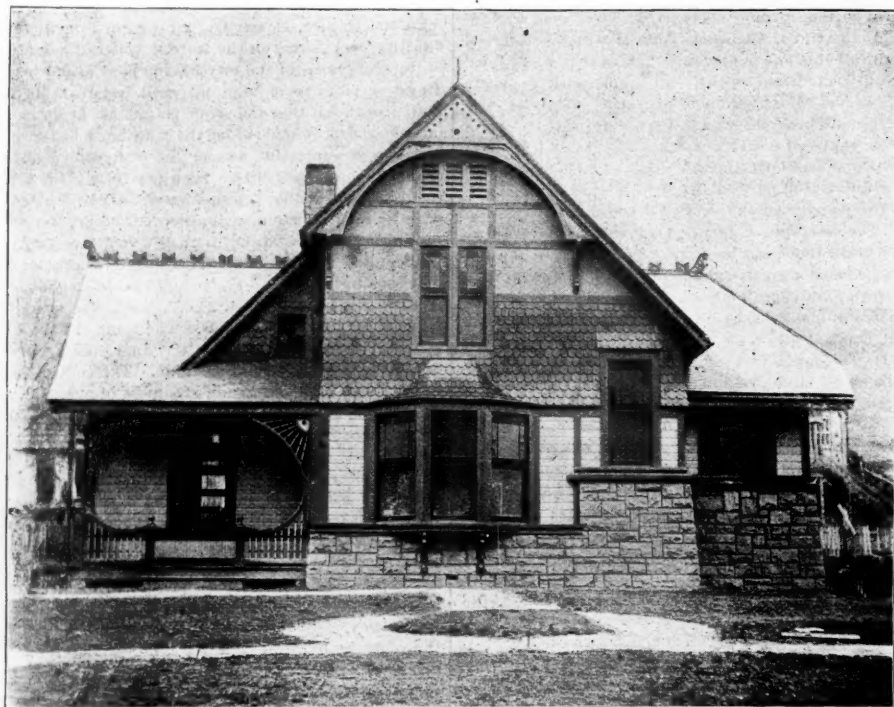
The annual expenses of a branch association vary from \$1,000 to \$14,000 in proportion to the size of the field and the completeness and effectiveness of the association. In many cases, thoroughly equipped buildings, which are practically club houses, have been erected either (a) by the

railroad companies themselves, (b) by the friends of the association, usually prominent stockholders of the companies, (c) by the united action of the companies, employees and general public, and some cases (d) by the companies, employees and the Young Men's Christian Association of the city in which the branch is located. A conspicuous example of the last named plan is the building which has recently been erected in the city of Philadelphia. The Pennsylvania Railroad Company in that case gave the deed of the land, worth \$22,000, as a site for the building, and a cash donation of \$10,000; more than 5,000 employees contributed \$24,000, and the Young Men's Christian Association of Philadelphia supplemented these by a gift of \$6,000.

The Chesapeake & Ohio Railroad has erected several buildings on the line of its road, a typical one being that at Handley, West Virginia, which cost \$5,000, and is admirably adapted to the work of the association. An engraving of this building is shown. The Railroad Men's Building in New York, which cost \$215,000, was the personal gift of Mr. Cornelius Vanderbilt, who for many years has been an active supporter of the work on the Vanderbilt lines and is the Chairman of the Committee of Management of the New York Branch. The beginnings of many of the associations are exceedingly small. At one point on an eastern trunk line, the only room available was 12 ft. x 14 ft., and yet within a year a saloon across the street which had been frequented chiefly by railroad men, was closed on account of lack of business. That association now occupies a building valued at \$4,000. At Mott Haven yards, in New York city, three old passenger cars are

sively to a distinctively religious work. At Sidney, New South Wales, a Railway Institute with a building 49 ft. x 113 ft. was opened in March, 1891, and contains a library, reading, coffee and smoking rooms and a large lecture hall. The management of this institute is in the hands of a committee selected by the members. The Commissioners of the New South Wales Government Railways contributed largely toward the erection of the building and assist in its maintenance.

The Railroad Branch is a combination of all the ideas for the improvement of railroad men which have been shown to possess merit. It supplies a place of resort where wholesome influences prevail. It maintains proper discipline in its rooms. It adapts itself to the special needs of a railroad center both in the location of its rooms and the conduct of its work. It makes prominent those agencies which contribute especially to physical comfort—the sleeping rooms, lunch rooms, baths, etc. It provides attractive entertainments for the men and their families thus developing their social life. It furnishes a meeting ground for officials and men and for employees of different grades promoting mutual respect and good will. It maintains educational classes, lectures and libraries, thus stimulating directly ambition and self-improvement. By deriving its support from the companies and the men, it promotes the interest of both and avoids the peculiar dangers which might come from its exclusive support by either. Its religious basis and its relation to the Young Men's Christian Association insure permanence, and constitute a bond of strength within the organization, as well as furnishing an aggressive principle in its extension.



Railroad Building of the Young Men's Christian Association at Handley, Chesapeake & Ohio Railway.

utilized as the association's home; one is fitted up as a reading and bath-room, another as a lunch-room, and a third as a dormitory.

The railroad branch is the product of three factors: 1—Corporate support by railroad companies; 2—Cooperation on the part of the employees; and 3—The contribution of supervision and tried and conservative methods by the Young Men's Christian Association.

Wherever there are railroads there must be large numbers of men employed in their operation. In the United States alone there are 821,415. The irregularity of the lives of these men, or at least of those engaged in the train service, makes their lot one of peculiar hardship in many ways and severs them from many of the restraints which surround other men of similar social, educational and religious training. That railroad manager is unfit for the responsibility of directing large bodies of such men, upon whose fidelity life and property depend to such a large degree, who underrates moral character and is indifferent to the surroundings in which his men spend their leisure hours; but there is abundant evidence that such indifference, where it exists, is rapidly disappearing. In the early Fifties railroad reading-rooms and libraries were established, but in nearly every instance they failed. The reading-room degenerated into meeting places for the vicious elements among the men, and the absence of restraining influences and proper discipline led to their general abandonment.

In England, railroad companies, as such, have made little if any provision for the comfort of their employees, but benevolent and philanthropic people have cooperated in the establishment of coffee houses which are intended to counteract the influence of the taverns, and they have been very successful, in many cases yielding handsome dividends. The chief agency for the moral elevation of railroad men in Great Britain has been the railway mission, an undenominational, evangelistic society supported entirely by private contributions and devoted almost exclu-

sively to a distinctively religious work. At Sidney, New South Wales, a Railway Institute with a building 49 ft. x 113 ft. was opened in March, 1891, and contains a library, reading, coffee and smoking rooms and a large lecture hall. The management of this institute is in the hands of a committee selected by the members. The Commissioners of the New South Wales Government Railways contributed largely toward the erection of the building and assist in its maintenance.

The claims which the advocates of the railroad association make when presenting the cause to railroad managers for support are that it is directly in the interests of the company to foster and encourage, by contributions of money, an organization which is actually solving the problem of providing attractive and elevating occupations for the spare hours of railroad men. The Interstate Commerce Commission in its report for 1892 speaks of the association as "a work commending itself even on the most practical grounds of pecuniary self interest." At a recent conference held in New York letters of cordial approval were read from such men among others as George M. Pullman, M. E. Ingalls, Frank Thomson Samuel Sloan, James McCrear, H. S. Haines and J. G. McCulloch. The endorsement of any railroad device by such gentlemen would insure for its promoters a patient hearing, and for the device itself a practical test by railway managers to whose attention it might be brought. Is it too much to expect the same method to be adopted in dealing with an association which claims so much for itself, and whose claims are supported by such a record and such testimonies?

The Steamship North West.

We have watched with a good deal of interest the remarkable experiment of the Northern Steamship Company in building the passenger ships North West and North Land for service on the Great Lakes between Buffalo and Duluth, and have noted from time to time the steps in the development of the enterprise. We call it an experiment, and a remarkable one, for such it seems to us, to build two vessels as big and powerful as many of the ships now running in regular transatlantic passenger line service, as

fast as the best of the transatlantic liners, more beautiful and complete than any of them in arrangements for the accommodation of passengers, and to build these ships for passenger service only. But even now only part of the extraordinary conditions are stated. These ships must compete from port to port, and from one end to the other of their run, with first rate railroad service, and in the time occupied in the journey they are at a great disadvantage. To make this time as short as possible they must limit the number of calls, and hence lose short trip traffic as well as the through business that might be picked up at several important ports. Thus, the North West stops only at Cleveland, Detroit, Detour (to transfer passengers for Chicago) and the Sault, leaving to other steamers and to the railroads the traffic of such important places as Dunkirk, Erie, Sandusky, Toledo, Port Huron, Marquette, Houghton and Ashland. Finally, the season is very short—five months at the most.

Obviously there was no use in going into such a competition in a cheap way; if interest is to be earned the service must be made so attractive as to draw a heavy through business during the short season. Apparently this is the theory on which the ships have been built and fitted up. The North West was launched last January and sailed from Buffalo on her first round trip June 6. The North Land was launched in May but may not be put in commission for regular trips this summer. It was the intention to get her running in August, but the labor troubles may prevent that, and naturally it will hardly pay to start her out later. The North West sails from Buffalo every Tuesday and from Duluth every Friday, the schedule time of each trip being 60 hours each way. We may repeat here certain data of her dimensions and power that we have given before. She is 386 ft. long over all, and 360 between perpendiculars; 26 ft. molded depth and 34 ft. 5 in. from the spar deck; tonnage, 4,229 gross and 2,981 net. Her engines are two, vertical, quadruple expansion, condensing; cylinders 25 in., 36., 51½ in., and 74 in. diam. x 42 in. stroke. The total horse power is 7,000. She has 28 Belleville boilers, 64 in. diameter, to carry 266 lbs. She has twin screws 13 ft. diam. and 18 ft. pitch, and is expected to make a maximum of 25 miles an hour in deep water and an average of 20 miles. The ship carries a refrigerating apparatus from the De la Vergne Refrigerating Machine Co., of New York. This will cool about 4,500 cubic ft. of space and will make 1,000 lbs. of ice a day and freeze 400 carafes for use on the table and in the state rooms. The provision rooms, which are cooled by this apparatus, consist of one for meat, another for butter, milk and eggs, and still another for other provisions.

It will be observed that only the best transatlantic ships excel this lake steamer in the combined elements of size, speed and power. But none of them equal her in completeness of the arrangements for the comfort of passengers. Her designers were familiar with the best ocean practice, and her captain was sent on a special trip across the Atlantic before taking her out, to pick up the best points of organization and administration in the ocean service.

A passenger on the second round trip of the North West has given us some notes from personal observation. All those parts of the ship which affect the pleasure and comfort of the passenger are as handsome and as complete as anybody could wish. The cabinet work, the furniture and all the decorations are considerably above the highest standard of transatlantic steamship practice. Mahogany has been freely used, both red and white, the staterooms are painted a light cream color, with gilt relief, and their carpets and hangings are in harmonious colors. All the brass work is of "antique" finish and the aim of the designers has been to secure a quiet and refined effect throughout. Besides the usual staterooms there are suites of rooms with private baths, large bedsteads, dressing tables and other arrangements to make them as comfortable as one's private bedroom. All of the linen for the bedrooms and for the tables was woven especially for the ship, and the glass, china and silver are very elegant. Meals are served at small tables, each seating six or eight persons, and all service is à la carte. The ship carries a chef from the Hotel Brunswick, New York, and the waiters are also from the best New York hotels and restaurants. So that in all that pertains to living it would be hard for one not to be comfortable. The rooms for general use include a dining-room seating 150 persons, a café for men, a bar-room, and on the promenade deck a smoking-room and a ladies' cabin and music saloon, and a reading-room. The smoking-room has an unobstructed view forward and the reading-room a like view astern.

The voyage itself is described as delightful. Those who have had the opportunity to be in Lake Superior in the summer know the beautiful atmospheric effects which are common there and that the temperature is always agreeable. The schedule is timed so that the St. Mary's, St. Clair and Detroit rivers are run by daylight both ways. This is not merely as a matter of interest to the passenger but also of prudence in navigation. Although the time from the Atlantic cities to Duluth, St. Paul, Minneapolis and northwestern points generally, is considerably longer by this route than by rail, it would seem as if the comfort of the lake journey and the attractions of the ship, the rivers and the lakes, would, with a great many travelers, more than overbalance the loss of time, and so far as we learn the vessel is running pretty full. In fact we are told by officers of the company that the steamer has made money every trip that she has run and that they feel no doubt whatever of the success of the experiment.

Progress of the Strike.

The report published in our last issue gave the situation on Tuesday, July 10. On Wednesday the most serious disturbances were in California, where a train carrying United States soldiers was derailed on a bridge near Sacramento and the engineer and three soldiers were killed. The press reports stated that there was strong evidence that strikers caused the wreck. The military took charge of the railroad station and other principal points in Sacramento and maintained order, but at other points in California the outrages continued. Oakland was still in the hands of the law breakers, the military force not being sufficient to clear the tracks of the railroads. At Los Angeles numerous trains were run but all had to be guarded by United States troops. On Tuesday night a passenger train was stoned near Los Angeles. From Spokane, Wash., it was reported that the Northern Pacific was resuming operations, a military escort accompanying every train. New men had been engaged in place of the strikers.

From Chicago the principal news on Wednesday was that the strike of Knights of Labor and others to help the American Railway Union, had proved a failure, few men leaving their work. Business was lively at the stock yards. There was no fire or police alarms in that district during the day. The United States Marshal reduced his force by 300 men. Six freight cars on the Illinois Central tracks near Jackson Park were burned up by incendiaries.

From Toledo considerable disturbance was reported, nearly all the roads being hampered in their freight work, though there was not much lawlessness.

It was reported from Indianapolis that the Cleveland, Cincinnati, Chicago & St. Louis had suspended more than half the employees on its lines owing to the falling off in freight traffic. From a dozen division terminals in Illinois, Indiana, Ohio and Michigan, a general improvement was reported, though at Brazil, Ind., Nashville, Tenn., and Meridian, Miss., the disturbance of business by the strike seemed to be increasing. At Duluth and Superior rioting was reported, though work in the freight yards of the Northern Pacific was resumed for the first time since the strike began at that point.

Thursday, July 12.—On Thursday everybody except Debs and his lieutenants acknowledged that the strike was a failure and the press despatches were toned down accordingly. At the General Managers' Association in Chicago it was estimated that 20,000 railroad men in Chicago and on the railroads near that city had engaged in the strike. Nearly 3,000 new men had been engaged by the Association and distributed among the railroads, and the companies individually had hired about 8,000 others. Freight traffic had not resumed its normal proportion, shippers apparently holding off even where railroads were open.

At Sacramento a leader of the American Railway Union was arrested as a principal in the train wrecking reported the day before. A fourth victim of the wreck died. From Terre Haute it was reported that a passenger train of the Chicago & Eastern Illinois had been fired upon by a mob. Two trestle bridges were burned in the coal mining region near that city.

On Friday Debs offered to call the strike off if the men should be taken back. This offer was sent through Mayor Hopkins, but the General Managers' Association returned it stating that no communication from Debs & Co. could be received.

At Sacramento the military fired into the mob, killing two strikers. General Ruger, commanding the United States troops, reported that the Central Pacific Railroad was open, forces having been sent over the road both from Ogden and from Sacramento. Nearly everywhere except in California business was being rapidly resumed and the strikers were rushing to get their places back. At Cleveland most of the yardmen who struck were taken back, but the Lake Shore & Michigan Southern filled the vacancies with new men. The firemen and brakemen on the Cincinnati, Jackson & Mackinaw had just got ready to strike and they all went out. On the Columbus, Hocking Valley & Toledo the situation was still stormy, the striking miners evidently being on hand in large numbers to assist in keeping up the lawlessness. A passenger train of the Big Four was wrecked at Fontanet, Ind., by a misplaced switch. There had been trouble at this place in connection with the coal miners' strike and it was believed that the switch was misplaced by miners.

At Cincinnati an agent of the American Railway Union was imprisoned for six months for contempt of court in interfering with the operation of the Cincinnati Southern Railway. At Topeka two employees of the Atchison were imprisoned for 30 days for disregarding the injunction issued by the court; they had assaulted a non-union switchman. There were similar sentences at Indianapolis, Albuquerque, N. M., and other places. At Milwaukee two similar cases were dismissed with a severe reprimand.

Saturday, July 14.—The blockade was broken in California but guards were required on all trains and passengers were few, people evidently fearing that more trains would be wrecked. The mob continued ugly in Oakland. At Sacramento the railroad and military officers took special pains to conceal the identity of trainmen and trains were run only by daylight. A railroad bridge was burned near Mayfield. Debs kept up his talk to the newspapers at Chicago, but some painters who struck in Chicago to help Pullman strikers, found, on trying to get their jobs back, that the Pullman men who were being sympathized with had stepped in and taken their places. The meeting of the General Managers' Association adjourned without day. Railroad traffic was moving smoothly at Toledo. Four

strike leaders were arrested at Galveston, Tex., for interfering with the mail, and several were imprisoned for 30 days at Denver for contempt of court.

Sunday, July 15.—Despatches from Chicago gave rough estimates of the losses by the strikes and rioting, but no definite information could be obtained. Railroad officers estimated the loss to the railroads at from \$5,000,000 to \$8,000,000. The number of freight cars burned up on the Pittsburgh, Cincinnati, Chicago & St. Louis was about 600, of which 100 were loaded. General Manager St. John, of the Rock Island, estimated the loss of his road throughout its lines at about \$1,000,000. Delayed mails from the east arrived at San Francisco by steamer from Seattle, having been taken across the Continent by the Great Northern road. There were 166 bags of letters and 1,500 bags of newspapers.

Mr. Arthur, in reply to a telegram from Debs, stated that he had advised engineers to run their engines wherever it could be done with safety, regardless of whom the company employed as firemen. He had advised his members that they were at liberty to take the places of any of the members of the brotherhood who had quit contrary to the laws of the brotherhood, but not to take the places of any of the members of the American Railway Union who had quit by orders of that organization. From Fargo, N. D., it was reported that the Northern Pacific strike situation was more complicated. The isolated location of that road seems to have made the securing of new men much more difficult than elsewhere.

Monday, July 16.—Lawlessness continued in California, the mobs swarming around the trains at Oakland as often as possible at unguarded points. One crowd was charged by the militia and 21 persons taken prisoners. Several were injured by bayonets. The persistency of the strikers in California was attributed to telegrams from Debs who said that if the men would hold out victory was sure. The first westbound through passenger train since the strike passed through Sacramento. The Southern California Railway announced a new time-table with several passenger trains taken off.

A passenger train of the Chicago & Grand Trunk was derailed near Battle creek about 3 a. m. It is said that the rails had been loosened. A man arrested at Terre Haute confessed that he and seven others derailed the passenger train at Fontanet, Ind., on July 13.

The Attorney-General at Washington received reports showing that over 50 strike leaders and others interfering with railroad traffic had been arrested at various places. Among these, besides those heretofore noted, were Knox, the leader of the American Railway Union at Sacramento, and 10 strikers arrested at St. Louis, including one who had been the mayor of a town out there. The Pullman car shops at Ludlow, Ky., were re-opened, 85 men going to work. The Governor of Alabama dismissed 10 companies of soldiers but kept nine companies on guard at Birmingham.

The following, from a press despatch of July 15, detailing some of the conditions on the Wabash, will give some idea of the state of things on numerous other roads.

Pursuant to orders issued by General Manager Hays of the Wabash, the various departments on that road will resume business July 16 with their regular forces. Thousands of employees will be affected by this good news. When normal conditions prevail 8,000 men are employed by this company. The track forces number about 3,000 men. The shops on all divisions, employing about 1,000 men, will be opened. This includes Moberly, Mo.; Decatur and Springfield, Ill.; Toledo, O.; Fort Wayne, Ind.; Peru, Ind., and Ashley, Ind. Clerks and office men, to the number of thousands, in all the large cities and towns on the line will also return to work. All these men were granted a temporary leave of absence about July 5, without pay, on account of the strike.

The Wabash has had other labor troubles. The engineers and firemen went out about 10 days ago, demanding a restoration of the wages in effect last September, or about a 10 per cent. advance. Although they agreed last spring to accept the 10 per cent. cut, while the general financial depression was pending, they took advantage of the A. R. U. strike, and insisted upon a restoration of the old scale. This being denied them, they decided to strike. Their action was not countenanced by the Brotherhoods of Locomotive Engineers and Firemen, however, so they struck as individuals. This being the case, the Company was permitted to fill their places with any class of labor they saw fit, without incurring the enmity of the two brotherhoods mentioned. General Manager Hays says that these engineers and firemen had not only agreed to work for a certain scale of wages for a certain length of time, but they also agreed to give him 30 days' notice in case they desired a change in the scale or wanted to quit work. The Company agreed at the same time to give them 30 days' notice in case they contemplated a still further reduction. Now that the men have violated their agreement, General Manager Hays will, under no circumstances, re-employ them. He seems charitably inclined, however, and thinks there are many of the men who were forced to strike through the aggressiveness of others. All such he has either employed or will employ in the future.

Tuesday, July 17.—E. V. Debs, G. W. Howard, S. Keliher and L. W. Rogers, officers of the American Railway Union, were imprisoned at Chicago for contempt of court in violating the injunction issued by Judges Woods and Grosscup restraining them from conspiring to hinder interstate commerce. They refused their friends' offers of bail bonds. The evidence on which the arrests were made consisted largely of telegrams sent out by these men to the leaders on various roads. One telegram on July 6, urging the men to be heroes and telling them that victory was sure, was sent to 124 leaders on a dozen different roads. The telegrams printed in the press despatches consist mostly of generalities which in themselves probably would not constitute contempt, though one telegram sent to a man on the Northern Pacific says, "Save your money and buy a gun." Some of the telegrams enjoined the men to commit no violence. The order of arrest was

issued by Judge Seaman, of Milwaukee, sitting at Chicago, and the trial is set for Monday, July 23.

Trains were moving everywhere but lawlessness was still reported. Near Dubuque, Ia., obstructions were placed on the track of the Chicago Great Western, and near Cincinnati a pile of sleepers was found on the track of the Big Four. At Fort Wayne the new yard men were brutally assaulted and a passenger train of the Pennsylvania was stoned. At Brazil, Ind., a bullet was fired through a Pullman sleeping car. At Memphis a round-house of the Illinois Central was set afire. Yard men were assaulted at St. Louis and at Laramie, Wyo., and at the latter place one new switchman was fatally injured. A through train arrived at St. Paul over the Northern Pacific, the first from the Pacific Coast in 18 days. It was stated that passenger traffic had been resumed throughout the entire line of that road.

The Chilling of Feed Water.

In the May number of *The Locomotive* is an article on the chilling action of feed water, showing the importance of properly locating feed pipes. The article is based on some experiments made on a boiler of the locomotive type, 24 feet 3 inches long, with 6 inches shell and 114 three-inch tubes. The fire box was 72 inches long, 66 inches wide, and 60 inches high. The boiler had been in use but a short time and was not covered, and when first set was supported at the back end by cast iron chairs, one on each side of the fire box. The boiler was fed by an inspirator, the feed water entering near the bottom of the water leg at the right hand front corner.

When put in use it was observed that the girth joint near the middle of the barrel sometimes leaked, and thinking this might be due to the weight of the boiler and its contents, another cast iron chair was put in at this point. This failed to obviate the difficulty but served to show that when the joint leaked the barrel was elevated at this point and did not rest upon the saddle provided for it.

In order to show graphically the extent of disaster and the time at which it took place, a simple apparatus was devised by which a strip of paper was moved horizontally by clock-work while a pencil at the end of a lever, the other end of which pressed against the under side of the boiler, magnified the upward movement of the boiler eight times.

The boiler was used to supply a pump which was worked intermittently, and at times lay idle for several hours, with steam on ready for use at a moment's notice. It was found that with the pump running and circulation in the boiler, the starting of the inspirator had but little effect upon the movement of the boiler, but when the inspirator was started at a time when there was no demand for steam, the boiler would rise as much as 0.28 of an inch and the steam begin to leak. The test was repeated a sufficient number of times to show conclusively that the comparatively cold feed water, when introduced into a boiler in which the circulation was sluggish, would chill the sheet to such an extent as to cause the distortion and leakage which had been noticed.

The feed pipe was then rearranged, the opening in the water leg plugged up and the feed led to the top of the boiler and passed downward through the sheet at a point just at the rear of the dome. After dropping to the level of the tubes, the feed pipe was led backward to within three feet of the back head. A pan was secured to the end and branch pipes leading to the right and left screwed into the pan so as to cause a discharge in both directions. This arrangement had the effect of decreasing the chilling action of the entering feed-water, the passage of the water through the length of internal pipe heating it to such a degree that when discharged its effect upon the sheets of the boiler was imperceptible. Diagrams taken with the same arrangement as before showed a total range of motion of less than 0.04 of an inch.

Railroads and the Federal Power.

The past seven years have seen a revolution in the relations between the railroads and the Federal Government whose extent is as yet scarcely realized. Before the interstate commerce act was passed the railroads were not seeking federal legislation. The federal courts were a convenient refuge from state taxation, but this was practically all.

On June 30, 1888, 4,474 miles of railroads, about 3 per cent. of the whole, were in the hands of receivers. At the end of 1893 there were in the hands of receivers 25,375 miles of road, with a capital of \$1,886,629,520. Additions to this list make the total now some 27,000 miles and nearly \$2,000,000,000 of capital. A fifth of our railroad capital and over one-seventh of our railroad mileage are in the hands of the federal courts. This change [in the financial conditions of railroads] is due to a commercial convulsion of unexampled severity, whose effects have neither been helped nor hindered by the interstate commerce act, as under it rates have shown a singular stability after the first reduction. But the existence of the act has kept the entire railroad system of the country before Congress. Bills on pooling, on rates, on ticket-scalping, on 1,000-mile tickets, on "private" cars, and on a score of other railroad subjects have been before the federal legislature. The federal courts have passed on "party-rates," the long and short haul clause, combinations and pools and the federal Commission's power to investigate illegal rates. The railroad managers and the public have both come to feel an increasing intimacy between the railroads and the federal power. The inevitable result in the strike which is now just over, has been an immediate appeal by the railroads for federal protection. It has been freely granted and this step once taken will be taken in future on less and less cause.

The federal power is now certain to be established as the immediate controlling force of our railroads. Regulation and protection will go together. The roads will find that the ease of federal protection they have secured will carry with it increasing ease of legislative action by Congress. Railroad evils and railroad reforms will be dealt with at Washington, and railroads, like those in New York, New Jersey and Pennsylvania, which have escaped with little or no regulation, will have to carry an increasing burden of federal interference.—*Philadelphia Press*.



EDITORIAL ANNOUNCEMENT.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The Railroad Commissioners of Massachusetts have issued a report on a collision which occurred at Sharon Heights, on the Boston & Providence division of the New York, New Haven & Hartford, on May 30 last, when three men were killed. A west-bound freight, switching on the east-bound main track in the middle of the night, sent out a red light to stop east-bound trains, but did not send it far enough. But the runner of the east-bound train was not keeping a good look-out (he evidently ran past an automatic block signal, a mile back, without looking at it), and so the commissioners find that there was carelessness or negligence on the part of "all who were charged with protecting the two trains" from a collision of this kind. And they conclude their report by saying:

"The investigation of this accident developed a remarkable ignorance of the rules on the part of some of the employees. The disastrous results of such ignorance in this and in too many similar cases, emphasizes the necessity of adopting some method by which it may be made certain that all employees shall not only receive a copy of the rules and regulations, but shall study and understand them. It would seem to be also highly desirable in the interest of economy, as well as of safety, that some systematic means should be adopted for the instruction of employees in the meaning and practical application of the rules. The saving in destruction to property, to say nothing of loss of life, would with hardly a doubt, more than balance the cost of establishing a system of instruction."

This is a simple proposition, and will be accepted without argument. It was well known years ago in railroading, and centuries ago in other business. To make a rule effective, it must be known that the men acting upon it understand its meaning. To secure this understanding where a large force of men is employed, the instruction must be systematic. And yet the Massachusetts commission, a body 25 years old, has to reiterate this truth in this year 1894, to the officers of a railroad 60 years old—a road, moreover, which has ample money and brains. And many other roads, of all ages, are subject to the same criticism. The railroad commissioners are obliged to assume that the company trusts the enginemen and conductors to instruct themselves, instead of seeing that they are instructed by an officer or an official board, for no better reason than that the damage to life and property under the looser methods is not serious enough to challenge public attention, or to lead juries to punish the railroad companies (for the disasters that do occur) with any greater severity than can readily be borne. In other words, the assumption is that the financial results are satisfactory with no higher standard of safety than that now in vogue. On the question of protecting human life at any possible cost, railroad officers agree, in a general way, with everyone else; of that there is no question. But when it comes to precise means, a good many railroad officers seem still to trust in God, but to give rather scant attention to keeping their powder dry.

As we said, we refer here to a great many of our best roads, not to the particular one on which this collision occurred. The details indicate that in this case there was the usual amount of evasion and prevarication. Probably some of these men were not nearly so ignorant, as they pretended to be, of what the rule book required of them. But that does not alter the point of the conclusion drawn by the commissioners. Where men lie for the purpose of escaping or mitigating punishment, the obvious remedy of

the superintendent is to make the process of instruction so thorough and systematic that the lying will not convince anybody. As long as so many human minds can honestly convince themselves, when dire necessity arises, that a story invented yesterday has become solid truth to-day, we shall not be rid of liars in the railroad service; but that does not destroy our argument, for, as every one knows, the vigorous maintenance of systematic instruction—which includes inspection—not only counteracts lies, but prevents them. It convinces men that there is no use in offering their silly defenses, and affords a ready means of weeding out of the service the class of individuals who depend on such defenses. Systematic instruction—with inspection—is also a most effective remedy for that other evil that so often appears when an accident is investigated—the softening of punishment for the purpose of avoiding a troublesome discussion with a brotherhood committee. Weak-kneed superintendents should be made to understand that they do a great injustice when they punish a brakeman more severely than an engineman, because the latter has an uglier committee at his back; and one of the best means to this end is a system of instruction, inspection, investigation and records so complete that the reason for and the justice of every punishment shall be patent to all observers.

Among the monstrous evils resulting from the Debs strike, every one has noted some good results. Not the least of these is a certain development of "sand" among railroad officers all over the West, by the example set at Chicago. The statement that reckless strikers will not be taken back on any terms is much more prominent in the press despatches, and has a more business-like sound, than ever before, and we trust that the impression conveyed by the despatches will be borne out by the facts. The Wheeling & Lake Erie adopted the most heroic treatment we ever heard of. As business was practically at a standstill, the General Manager, when the switchmen struck, discharged the whole force of men on the road in all departments (about 1,600 of them), to be taken back only as needed, and on renouncing the American Railway Union. While this is a high-handed proceeding, and one which can hardly be carried out with justice to innocent employees, every employee sympathizing with his fellows who struck can reflect that never before did railroad men strike for less provocation. We have repeatedly spoken of the admirable firmness and coolness of the Chicago officers. They did exactly the right thing in the right way from the start, and while we expect no revolutions, we regard this as a turning point in the method of dealing with strikes. Let the law protect every man in his rights.

Under the time-interval system of running trains flagging is vitally necessary, while under the space interval system it is entirely worthless. This is a radical difference, which is manifest in practice as well as in theory, although, by telling trainmen to continue acting under the old system after the new has been adopted, we try—both English and American railroads try—to ignore the difference, so far as it affects the duties of trainmen. This was illustrated at New Haven the other day, where a rear collision of passenger trains occurred in "the cut," a crooked piece of road which has been operated successfully under automatic block signals for many years—longer, perhaps, than any other piece of road in the country. A big fire had destroyed the connections to the signals, and an engineman, running without their protection, followed the preceding train too closely and bumped into it. He may or may not have been notified with sufficient intelligence and care as to the changed conditions under which he was to run—we have not inquired minutely as to that—but an important lesson of the occurrence is that when the space interval is once put in use we may as well at once give up all thought of getting adequate protection from flagging. The opening sentence of this paragraph may be subject to slight modifications if we expand it to include all possible variations in conditions; but, nevertheless, the space interval system is so simple, and so perfect theoretically, that trainmen will place their main dependence upon it, in spite of any possible teaching to the contrary that you can pound into their heads; and a return to the time interval, even temporarily, is a risky expedient. The New York, New Haven & Hartford road presumably follows the fashion of most other roads using automatic block signals, and instructs its men to observe the time-interval rules the same as if there were no space-interval regulations in existence, but the more experience we have the more does the futility of this rule appear. The safest plan, when automatic signals have to be temporarily disused, is to

establish a telegraph block system between the nearest telegraph stations, even if they are a good deal farther apart than the automatic signals are. This does, indeed, look like excessive caution; but there are times when nothing less will afford assurance of reasonable safety, while a sudden falling back upon the time interval must always be accompanied by doubts as to whether all the tail-end men fully understand the change. The only satisfactory way of quickly making sure that they do understand it is for the train master or superintendent to see each one personally. When the absolute block system *must* be suspended, the rational alternative is not the time-interval, but permissive blocking, which means that the second train must run expecting to find the first one at any point in the block, standing still, and not protected by a flag, a torpedo or anything of the kind.

Gross Earnings in June and for the Half Year.

The decline in railroad gross earnings for the month of June, as compared with the same month last year is doubtless the greatest ever recorded. In May it was bad enough, having been 17.55 per cent., but in June it reached 21.48 per cent. What it will be for July we dislike to think. For the six months ending with June 30 the decrease on 124 roads amounted to 15.85 per cent. This, however, did not include some of the most important roads, and the *Chronicle*, to which we are indebted for these figures, makes up an auxiliary table of 76 roads to the end of May, and finds that the total loss for the 124 roads for six months, and the 76 for five months, amounts to 16.5 per cent. Further, estimating roughly the loss on the total mileage, that is, including all the roads not reporting, the falling off in gross earnings for the half year will probably be not less than \$100,000,000. These figures are easier to write than they are to grasp. A decline of one-sixth in the gross earnings of the railroads of the United States means a profound disturbance of existing conditions, and must react very seriously on all industrial and commercial interests.

Of course, the causes of the great falling off in earnings are patent to everybody, and most of them are very general. But while they have affected all the roads, all of them have not acted with the same intensity in all regions, or on all roads. For instance, setting aside the universal business depression, the great coal strike which began in April was the most important of all the influences acting for a short time to lower the aggregate earnings of the first half year. But that was rather an advantage than otherwise to the anthracite roads, and even one of the bituminous roads, the Norfolk & Western, made money out of it because the operators in its territory did not strike. That road lost 5 per cent. in its total earnings for the first half of the year as compared with 1893, but in May it lost only 3 per cent., and in June it actually gained 10 per cent.; its loss in April had been 16 per cent. Its direct competitor, the Chesapeake & Ohio, lost 34 per cent. in May, 23 in June, and 17 in the half year. The Erie, which does a large anthracite business, had lost 24 per cent. in April, but in May it lost only 19 per cent., and its loss for five months was 22 per cent. The Pennsylvania is also a heavy carrier of anthracite, but it carries a large tonnage of bituminous and of coke. Its losses for five months were 21 per cent., and for May were 30 per cent. When we take some of the roads that practically live from the bituminous coal traffic, we find the loss enormous. Thus, the Buffalo, Rochester & Pittsburg lost 70 per cent. in May, 63 in June and 35 per cent. in the six months. The Chicago & Eastern Illinois lost 53 per cent. in May, the same in June, and 31 in the six months. The Pittsburg & Western lost 30 per cent. in May, 37 in June and 19 in the half year; in April its loss was 28 per cent. The Western New York & Pennsylvania lost heavily in May, namely 41 per cent., but in June it had begun to recover, its loss having been 27 per cent., and in the half year also 27 per cent. The Wheeling & Lake Erie, which in April was only 10 per cent. behind the previous year, fell behind 52 in May, and 54 in June, its total loss for the half being 29 per cent.

The strike on the Great Northern, the interruption to business in the far northwest from the Coxeys' craze, and the disastrous floods in May, added to the depression already existing, make a very bad showing indeed for that region. In April the earnings of the Great Northern fell off 52 per cent., in May 16, and in June 38 per cent.; while for the half year the loss amounts to 29 per cent. The Northern Pacific lost 34 per cent. in April, 36 in May, and 51 in June, the loss for six months being 36 per cent. The Denver & Rio Grande and the Atchison have also been severe sufferers. The Rio Grande's loss in April was 23 per

cent., in May 27, and June 35, and for the half year 29; while the Atchison's loss was 13 per cent. in April, 25 in May, 34 in June and 23 for the six months.

Those trunk lines and great roads, which up to the last strike had not been affected by special and local conditions, have fared better than the roads which we have mentioned. For instance, the New York Central lost in May 18 per cent., in June 16, and in the six months 13. Its greater loss in May was probably due to the coal strike, which affected it seriously, but not so seriously as the bituminous carriers. The Chicago, Burlington & Quincy lost 23 per cent. in May, and 18 in the five months. The Chicago & Northwestern lost 18 per cent. in May and 12 in the five months; the Illinois Central 16 per cent. in May, and 9 in the five months. The Chicago, Milwaukee & St. Paul lost 15 per cent. in May, 18 per cent. in June, and 16 in the five months. The Rock Island suffered more heavily in June, having lost 28 per cent., but only 11 in the six months. The Big Four and the Grand Trunk of Canada likewise lost but 11 per cent. each in the half year, and they lost 16 and 17 per cent. respectively in June. The Canadian Pacific lost more heavily than the Grand Trunk, that is, 12 per cent. in May, 23 in June, and 14 in the half year. The Wabash was one of the heavy sufferers; in April it had lost but 12 per cent.; in May, however, its earnings went off 23, and in June 32 per cent., the result for the half year being a loss of 18 per cent.

These examples are characteristic, and might be multiplied indefinitely. Enough have been given, however, to show the general course.

The *Chronicle* has made up the percentages of loss, for the month of June, of various groups of roads, from which it appears that the southern roads lost less than any other group, namely, 9.18 per cent. The southwestern lost in the month 26.85 per cent. This group includes the Atchison and the Denver & Rio Grande, which have been heavy losers, although the Missouri, Kansas & Texas, included in the same group, lost a little more than the average, that is, 27 per cent. in the month. The average loss of the trunk lines given is 18.84 per cent.; but this is liable to considerable change when the June returns of all the lines are in. The middle and western group lost 27.8 per cent. This includes the Rochester & Pittsburg, the Chicago & Eastern Illinois, Wheeling & Lake Erie and several other important carriers of bituminous coal, which, of course, suffered very heavily. In the Northwestern group the average loss was 23.77 per cent. Included here are the Great Northern, with a loss in June of 38 per cent., and the Chicago, Milwaukee & St. Paul, with a loss of only 18 per cent. So it will be seen that the range in the group is pretty large.

Of course, we must all expect very serious losses indeed in July, and beyond that it would be idle to look at present.

Another Railroad Law.

Railroad regulation is now before the Commerce Committee of the Lower House of Congress in a form quite different from that which has been the subject of recent discussions. Representative Straus, of New York, has introduced a bill, which has been referred to that committee, to regulate the conduct of railroad affairs in several features not touched upon by the Interstate Commerce Law. The bill is quite long. It applies to all railroads which come within the constitutional control of Congress, and its first provision requires the Interstate Commerce Commission to appoint "examiners" in each judicial circuit, whose principal duty it will be to look into the financial affairs of railroads whenever a receiver is appointed. There is a provision requiring quarterly reports from railroad companies, which it is evidently intended shall be sent to the Interstate Commerce Commission. The examiner must report to the Attorney-General any suspicious circumstances, and the latter must prosecute any persons found guilty of breach of trust, etc.

Every railroad must keep a record of stockholders, open to the inspection of stockholders; no stock shall be voted except by the bona fide owner; voting trusts are prohibited; a receiver must have no interest in the railroad nor have been employed by it for one year previous, though the original receiver appointed is to hold office only until a person is designated by the bondholders. Paying for votes or receiving pay for voting is prohibited; courts appointing receivers must set a limit upon current expenses; a receiver must have nothing to do with the election of directors or any plans for reorganization; no receiver, director, officer or agent may "sell short" the securi-

ties of the road; no such person shall be interested in any contract or agreement to which the road is a party.

While the general purpose of this bill is praiseworthy, its presentation at this time will probably do more harm than good, from the mere fact that Congress will adjourn as soon as the tariff bill is out of the way; and even with ample time for discussion the provisions of the bill involve so many knotty problems that the chance of getting a workable law through both houses would be exceedingly slim.

One provision, that prohibiting voting trusts is, we think, to be condemned at once. The framer of the bill aimed, no doubt, to prevent locking up railroad stock in irresponsible hands, but in point of fact, this device has been used for just the opposite purpose, to keep stock free from speculative control, and has been of great use in reorganizing and rehabilitating railroad properties. Other provisions of the proposed bill, like that forbidding a railroad officer to sell stock which he does not possess, are good in theory, but never can be enforced. To insure the appointment of impartial and competent receivers for all bankrupt railroads, would, indeed, be a great public good, but at this point the proposer of the bill himself seems to feel rather shaky, for his provision for transferring the receivership to the bondholders is crude. In short, every one of the sanctions and prohibitions here presented belongs to that class which depend for their force almost entirely on public sentiment. The *New York Journal of Commerce*, in urging the passage of the bill, calls attention to the many lines which have

"Required reorganizations and repeated reconstructions of their finances, with resulting heavy losses to investors, but with great speculative gains to those controlling their operations. Another result [of American financial customs] has been a world-wide injury to the credit of American corporate enterprise, much to the injury of the nation, and with consequent exposure to disaster in periods of international crisis. Yet another consequence, more serious than all others, has been the setting up of a standard of corporate morals which has tainted our whole system of bargain and contract and trusteeship."

The contrast to this which we see in England is, indeed, partly due to the law of 1845, prohibiting railroad directors from having any interest in contracts with the company; but the strength of that law lies in the powerful public sentiment, under which any one, high or low, who violates it, finds his business reputation destroyed.

Night Schools for Apprentices.

¶ We spoke the other day of the obligation resting on the railroad companies to get good men as one way of preventing wanton strikes. To put it a little more precisely this is the duty of those who are intrusted with the management of railroad properties, be they operating officers or directors. It is their duty to the stockholders and to the public. Their first duty is to administer the properties in their charge so that they will earn money for the owners; next to so administer them that the public will be well served; and these duties are not sentimental, but everyday, business ones and cannot be dodged.

All this, however, is very general and the railroad officers may naturally ask us how they are going to better do their duty in this one particular of securing better men. One way is to catch them young and train them; and to this system, greatly in vogue in England, is due much of the permanency of what is known there as the "wages staff." There the boys are taken into the service young; in the offices, about the stations and in the shops. They serve their apprenticeship, are gradually promoted and probably pass their lives on the one line with which they first took service. They have pension funds, sick and death relief funds, accident insurance and other organizations of like nature, all of which help to make them feel that the service of the line is a life career and that they too have a stake in the prosperity of the road for which they work. So these men are not bedouins, pitching their tents here and there for a night or two, but solid citizens; a permanent and respected part of the communities in which they live.

We judge that much can be done in the way of breeding such a spirit among American railroad men by giving to lads who go into the service as apprentices chances to fit themselves, not only by their daily work, but by night schools, for the careers in which they may hope to rise. It is not necessary to this end to establish schools so elaborate as the famous one started at Mount Clare on the Baltimore & Ohio under the auspices of Mr. Garrett and on the broad lines laid down by the late Dr. Barnard, but much cheaper and simpler arrangements may be made very useful. As an example of such we may cite the schools now actually existing on the Michigan Central. These are, we believe, directly due to the ideas of the President, Mr. H. B. Ledyard, but they have been carried out cordially and zealously by the General Superintendent, Mr. Robert Miller, and under the direction of the officers immediately in charge.

These schools are situated at three points, Jackson and Detroit, Mich., and St. Thomas, Canada. In the Jackson shops the principal locomotive work is done and the instruction in the schools there is confined chiefly to the

locomotive. Mr. C. E. Smart, General Master Mechanic, has general supervision of the instruction. At Detroit the work is confined to car building and repair, and the instruction given in the schools bears directly on car design. Mr. E. D. Bronner, Master Car Builder, supervises the instruction. Both car and locomotive work is done at St. Thomas, and instruction is given accordingly; Mr. M. L. Flynn is Master Mechanic there. Separate rooms devoted exclusively to the work of the schools are provided at each of the three places. The rooms are supplied with desks, stools and suitable places for drawing-boards and necessary material. The railroad company furnishes everything needed in the school and pays the instructors. At Detroit freehand and mechanical drawing is taught: the freehand being confined to decorative art in its relation to the decoration of passenger cars; the mechanical drawing is mostly in the line of car construction.

When an apprentice shows rapid progress in the shops and school at Detroit he may be sent to the Jackson shops; this is looked upon as a promotion, as it is considered more desirable to be a machinist than to be a woodworker. Sessions of the schools are held one night each week, nine months in the year. The attendance is compulsory, as it is thought by the officers that if an apprentice will not take an interest in the advantages offered, he will make an indifferent mechanic; hence it is best that he give way to another who will take more interest. In this way the best material for mechanics is secured. As a further incentive for the young men to attend the school regularly and to work in the classrooms, the company gives three prizes each year to each division school and three general prizes. For the former the competitors are the members of each school, while for the latter the competitors are from all three schools. The total amount of these prizes is several hundred dollars yearly. It has frequently happened that a young man's brightness has attracted attention in the school, and advancement in the service of the company has followed. There are several men now holding important positions with the company who look back to satisfactory work in the schools as the beginning of their advancement.

A letter from China dated May 15, informs us that the extension in the northeastern direction of the Imperial Railway of North China had been completed from Kai Ping as far as Shan Hai Kuan at the end of the great wall. The Viceroy Li Hung Chang was to open it officially the week after that letter was written. The line was located last spring as far as Ta Ling Ho, 130 miles east of Shan Hai Kuan, but the funds allotted for the construction were diverted from the railroad work to provide for the fête at Peking, celebrating the 60th birthday of the empress, so only a portion of the located line can be built this year. About 40 miles will be built on the western end and 20 on the eastern end. The material is landed at Kin Cheu Bay, about 20 miles south of the celebrated city of Kin Cheu. We regret to learn that Li Hung Chang in his old age seems to have less regard for the efficiency of the public service than so enlightened a man would be expected to have and that he has put in high place in connection with the railroad his nephew Chang, who appears to be a corrupt and obstinate man, and is making a good deal of trouble for the railroad administration. No other railroad project is making any headway now. Apparently the enterprise of taking out American operating officers, which made a little sensation here a year or two ago, has failed, as the four Americans who went to China in the railroad service have left. The authorities at Peking are rather obstructive than otherwise; nevertheless it is believed that the line will be completed to Ta Ling Ho next year or by the spring of 1896, then the line may be carried on to some point near Moukden and down to Newchwang to the southwest and Kirin to the northeast as was the original plan. At least 10 years will be needed to do this work at the present rate, and until it is completed it is not likely that any other line except perhaps in Formosa, will be started. It is proposed to lay the Newchwang-Kirin line with 90 lb. rails, to use heavy engines and 30-ton cars. This line ought to have a heavy traffic, and the connecting line from Tientsin to Moukden will probably do a good passenger business, as does the line already existing. The passenger rate is astonishingly low, being 0.33 cent, gold, per passenger-mile. The cars are 65 ft. long and carry 100 passengers. In India such a car would be made to carry about double this number, the passengers being packed in like sheep. Three locomotives from Germany are now at work near Kin Cheu Bay, about 10 miles of track having been laid. These are the first engines to run in Manchuria. The bridge building shops at Shan Hai Kuan were started early in May, building 60 ft. plate girders and 100 ft. trusses for bridges for the line beyond the great wall. These shops are equipped with Tweddell's hydraulic machines, and it is said that bridge material can be turned out cheaper than it can be procured from Europe. The steel is mostly from Scotland. It is good material, costing about £5 per ton f. o. b. England, and the freight out is from 30 to 40 shillings per ton. The Lan Ho bridge was completed five months ago. It is 2,260 ft. long and 35 ft. above the water level. The pneumatic process is a good deal used in sinking the bridge caissons for the bridges built on these lines.

The Secretary of the Master Car Builders' Association has sent out a circular and ballot slip to procure a letter ballot on certain recommendations adopted at the Saratoga convention. The vote will be counted Aug. 14, so those

who propose to vote at all had better be stirring and not allow the slip to lie until too late to get their votes in. The recommendations to be voted on are standard sizes for catalogues, etc.; wheel and flange gages; height of brake beams; limit of thickness of steel tires; safety chains for freight cars; standard bearing and wedge for $3\frac{1}{2} \times 7$ in. journal; standard gages for all new journal bearings and keys; a modification in the dummy coupling hook; air brake repair card; wheel base and size of bars for diamond truck and attachment of ladders to freight cars. The most important of these recommendations it seems to us are those on wheel and flange gages; that is, the establishment of stricter gages and more uniform practice in adhering to them, appear to be absolutely necessary to prevent a certain class of accidents. The committee proposed and the convention voted to submit to letter ballot a set of definitions and maximum and minimum gages for wheel flanges and a new and definite wheel mounting gage. A gage fixing the throat for frogs and guard rails and the distance between wing rails is also proposed. We shall be rather surprised if a very full vote is brought out on this special matter and yet the proposed gages ought to be adopted at once.

The Chicago city council has passed a new track elevation ordinance by a vote of 60 to 7. The ordinance is mandatory and directs that the Lake Shore & Michigan Southern and Chicago, Rock Island & Pacific shall elevate their tracks by August 1, 1899. Among other things the ordinance provides that the railroad companies shall pay to the city \$100,000, in lieu of land damages; that they shall pave all subways with vitrified brick on a 9-inch bed of cement, build cement sidewalks, light all subways with electric lights, remove all the sewers and water pipes to a brick conduit, provide pumps to pump out surface water and operate the pumps at the expense of the companies. One of the provisions of the ordinance provides for the vacating of 19th, 20th, 21st and Spring streets. An attempt was made to have the latter provision stricken out, but it was defeated. The average elevation is 18 in. higher than was stipulated in the previous ordinance which was proposed, and the depression of the cross streets is correspondingly less. As the provisions of this ordinance are understood to have been agreed to be the two railroads interested this means that all parties interested are now ready to proceed with the improvement.

NEW PUBLICATIONS.

The Iron Founder Supplement. An Exposition of the Art of Casting in Iron. By Simpson Bolland, practical moulder and manager of foundries. 392 pages, octavo, over 200 engravings and alphabetical index. Price \$2.50. New York: John Wiley & Sons, 1893.

The Encyclopedia of Founding and Dictionary of Foundry Terms Used in the Practice of Moulding. Same author and publisher; 536 pages, octavo. Price \$3.

It is the purpose of these volumes to give, in a simple way, and with sufficient illustration, the sort of information that is necessary to those who are casting metals and especially to the moulder. The first volume is called a supplement to a preceding volume by the same author, "The Iron Founder," which was designed to give the information needed in the actual daily practice of the moulder's art. The supplement is designed to give him information concerning many other matters not so absolutely necessary, but of which he should possess knowledge if he aims to be an expert. It treats of the processes of mixing, casting, pouring and moulding, and of appliances and materials in use.

The second volume is a sort of dictionary and cyclopedia combined; that is, the definitions are often carried to the length of several pages. It contains a great many topics that do not appear to be especially useful to the readers for whom it is particularly designed; and is a good deal more elementary than it need to have been if the same space had been given to a more careful treatment of the various topics. Doubtless both volumes will be found very useful to the special trade to which they are addressed, and the first one has a good deal of information that it is desirable that many others than moulders should have.

Car Trusts in the United States.—A brief statement of the laws of contract of conditional sale of rolling stock to railroads. By Gherardi Davis and G. Morgan Browne, Jr., of the New York Bar. New York: Published by the authors, 44 Pine street.

The authors of this pamphlet of 50 pages say that it was suggested by the difficulties presented in several cases in which the question of the validity of certain car trusts was raised and that this is a special topic on which very little has been published in the text books or out of them, hence the pamphlet. The authors develop the growth of the system of car trusts and the law as established by court decisions, and show the status of the car trust as a lien. An appendix gives forms of contract and car trust agreement and of a certificate, and a table of statutes relating specifically to conditional sales of rolling stock. Doubtless the pamphlet will be a useful one to lawyers and others who have reason to be familiar with this subject.

Improvement of the Road System of Georgia. By O. H. Sheffield, C. E., University of Georgia. Washington: United States Department of Agriculture, 1894.

This pamphlet of 32 pages is an essay which received a prize in 1892 from the State Agricultural Society of Georgia, and which is transmitted to the Secretary of the Interior by Roy Stone, Special Agent and Engineer in charge of the Office of Road Inquiry of the United States Department

of Agriculture, with the recommendation that it be printed as a Bulletin of that Department. It appears to be a useful popular paper on the building and maintenance of county roads and will probably have good results in the way of educating town officers and the people generally in the regions remote from the larger towns.

A Text Book on Roofs and Bridges.—Part III. Bridge Design. By Mansfield Meriman, Professor of Civil Engineering in Lehigh University, and Henry S. Jacoby, Assistant Professor of Civil Engineering in Cornell University. New York: John Wiley & Sons, 1894.

This volume, in continuation of the series by the same authors, is announced for publication August 15. It is an octavo of about 400 pages.

The Official Railway List, 1894.—It is sufficient to announce the appearance of this publication, its character being well known. It is published by the Railway Purchasing Agent Co., The Rookery, Chicago.

TRADE CATALOGUES.

The Value of Tie Plates in Track Repairs. By Benjamin Reece, M. Am. Soc. C. E. Chicago and New York: The Q & C Co., 1894.

Last April Mr. Reece read before the Buffalo Association of Railroad Superintendents, a paper on Track and particularly on the uses of tie plates. This paper is now printed by the Q & C Co., in a pamphlet of 64 pages, with numerous illustrations and with the text carefully divided for convenient reference, with marginal headings and with a table of contents. We hesitate somewhat about classifying this pamphlet under "trade catalogues," as it is, so far as we know, the best monograph yet written on tie plates, yet it is published as an advertisement of the Servis tie plate, and therefore it would probably be inconsistent with the dignity of a great journal to classify it under "new publications."

Mr. Reece prefaces his paper with an explanation of the circumstances under which it is written, and explains that he began his service with the Q & C Co., much prejudiced against tie plates, and that his present opinions regarding tie plates are the result of a severe education. The first part of the paper is on the economical value of track, having regard not only to cost of maintenance but to the efficiency of the transportation machine. It would seem as if this theme would not need much argument before a body of operating officers, and perhaps it does not, but the officers in control of the financial policy, and the directors of the railroads, ought to read carefully this part of the paper. This is followed by the stricter discussion of tie plates in which their mechanics and their functions are carefully developed. An appendix contains an extract from the lecture of Mr. Loree before the engineering class of the University of Wisconsin, copious extracts from which were published recently in the *Railroad Gazette*, and also a report by the Robert W. Hunt Co., on the Servis tie plate published in the *Railroad Gazette* of November 3, 1893. Copies of the pamphlet may be had gratis on application to the Q & C Co.

Railroad Summer Resort Literature is not very obtrusive this year. By this we do not mean that its quality or plentifulness has fallen off, but only that the G. P. A. has less to say about new books, new editions and other novelties. This is probably due, primarily, to the hard times, though several traffic men have told the reporters that Summer travel promised unusually well. Perhaps the more general inclination of people to go to their summering places this year so as to make up for the slight they gave these haunts last year by going to the World's Fair instead, will make it unnecessary to advertise as profusely as usual. Of the Summer books received, that of the New York and Albany day line steamers is the most novel, being well filled with many new direct process cuts. Good photographs are now so common that the passenger-man who does not use them liberally is really neglecting his road. The Michigan Central's "Summer Note Book" is well planned, does not try to describe the whole of North America and is especially commendable for its large type. The Lehigh Valley has come out with a 30-page pamphlet, "In three States," which confines itself to places on the company's lines. It has a large number of colored pictures, most of which are illustrations; but you have to pay 15 cents to get the book, which does not seem the proper way to issue an advertisement. The example has been set, however, by the New York Central and the Pennsylvania, and whatever those two roads do must be right for the rest. Their books are very large, however, while the Lehigh Valley's is small. The Michigan Central book has a few advertisements but it is circulated free. No advertisements are visible in the Pennsylvania book, but the latter has a gorgeous cover in several colors, which probably makes the book costly.

Steel Stock Guards.—Merrill-Stevens Manufacturing Co., Niles, Mich.

The Merrill-Stevens Manufacturing Co., in issuing an illustrated catalogue of patent steel stock guards, says: "We do not wish to take up your time reading trash or attempting to make you believe we are the only ones who make stock guards. We present cuts of the different styles manufactured by us, showing the principle, construction, etc. We have never been guilty of the attempt to cheapen the cost of our guards either in material or labor, regardless of strength, durability or efficiency, but we manufacture guards that meet all requirements at the least possible cost." This steel surface cattle guard must be reasonably familiar to the readers of the *Railroad Gazette*, having

been illustrated in our columns in times past. It is made of T-iron, turned so that one flange is upward, the ends inserted in steel angle plates, and supported at the middle by a U-shaped plate resting on the ties. The company also advertises in this pamphlet Cook's patent all steel cattle guard. This is made of plates set on edge, the upper edges serrated, and is an ugly looking device. With this design is furnished what is called a "hog attachment," being an auxiliary plate provided with bent saw teeth, which looks as if it would discourage any hog.

A. S. Males & Co., 171 Vine street, Cincinnati, have issued a hand book describing a great variety of railroad equipment for sale by the firm. It gives dimensions of over 120 locomotives of every type, for standard gage, 3 ft. gage and odd gages, and the condition of each engine is clearly stated. The firm also has on hand a great variety of day passenger, offices and sleeping cars, as well as freight cars, hoisting engines, steam shovels and other second hand railroad equipment.

Ore and Rock Crushing Machinery.—Farrel Foundry & Machine Co., Ansonia, Conn.; Earle C. Bacon, Engineer, Havemeyer Building, New York.

This is a catalogue of ore and rock crushing machinery, revolving screens, elevators, conveyors, road rollers, etc. A variety of crushers is also shown, a mortar mill, revolving sizing screen and other plant. The company makes a specialty of fitting out complete plants, including engines, boilers and all machinery and attachments.

Modern Turret Lathe Practice. The Gisholt Company, Madison, Wis.

The June pamphlet of this company shows a 28 in. turret lathe turning a cylinder head, a 28 in. gap lathe boring and turning a clutch sleeve, a $1\frac{1}{4}$ in. screw machine and a universal tool grinding machine. It is the purpose to issue this pamphlet monthly, giving illustrations of some of the uses of turret lathes.

India Rubber Goods for Mechanical Purposes. Boston Belting Company, 256 & 260 Devonshire St., Boston, Mass.

The company issues a catalogue under the date of June, giving cuts, descriptions, prices, etc., of the india rubber goods which it manufactures. The catalogue is of convenient pocket size and contains an alphabetical index.

The Providence & Stonington Steamship Co. has issued a folder giving complete information regarding excursions, rates, etc., to points in New England, the White Mountains and the British Provinces. Copies may be obtained by writing to J. N. Babcock, Assistant General Passenger Agent. New Pier 36, North River, New York.

TECHNICAL.

Manufacturing and Business.

The Industrial Works of Bay City, Mich., have opened a branch office in the Monadnock Building, Chicago.

A company to be known as the Continental Palace Car Co., has applied to the Secretary of State of Illinois for a charter.

The property of the Madison Car Co., has been taken out of the hands of Paul A. Fusz, assignee, and restored to the company.

The New England Car Coupler Co. has been organized at Portland, Me., with \$100,000 capital stock. The officers are J. W. Fellows, of Manchester, N. H., President, and J. A. Hinson, of Chicago, Ill., Treasurer.

A 10-ton Morgan electric overhead traveling crane of 52 ft. span has been erected in the foundry of the Hydraulic Machine Co., of Pittsburgh, Pa. The crane is to be used to supplement a 20-ton Shaw electric crane.

The St. Paul Refrigerator Car Co., of South St. Paul, has been organized with a capital stock of \$200,000, with Philip S. Shufeldt, Arnold Kalman, Ansel Oppenheim, Gilbert T. Spilman and Frank Clifton as incorporators.

The Brown & Sharpe Mfg. Co., and the Darling, Brown & Sharpe announce that the works will be closed from August 6 to August 18, inclusive, for annual vacation and repairs. The office will be kept open as usual, and all orders will be promptly filled for machinery or tools usually kept in stock.

The following directors for the American Steel Casting Co. were elected at Chester, Pa., on July 12: Daniel Egan, W. N. Wilson, N. H. Larzelere, Henry Weston, Charles I. Travellian and Frederick Frazier. It is generally understood Mr. Egan will succeed Joseph K. Bole, deceased, as president of this corporation.

Mars & Lewis, of 18 Broadway, New York, have completed the trestle work for the Park Avenue improvement in New York City and have nearly completed the $7\frac{1}{2}$ miles of boulevard for the Nayang & Elmhurst Boulevard Co., near Scranton, Pa. They have now under construction coal pockets and approaches for the Buffalo, Rochester & Pittsburgh Railroad at Bradford, Pa. This firm also put up all the timber trestles for the Johnsonburg extension of this road, the entire work covering several million feet of southern pine. The firm is also constructing the foundations for coal pockets for the East River Gas Co., at Ravenswood, L. I.

Iron and Steel.

The Lackawanna Iron & Steel Co. has ordered 5,000 tons of ore from the Colebrook Furnace, for an experiment as to its adaptability for use in its plant at Scranton, Pa.

Work has been commenced on the new buildings for the

Ellis & Lessig Steel & Iron Co., at Pottstown, Pa., to take the places of those burned June 10. Nail making is now being carried on in the open air.

R. Curzon Hoffman has been appointed, by the Circuit Court, at Baltimore, receiver for the company in Maryland, as an auxiliary to the receivership of the Pennsylvania Steel Co., in Pennsylvania, which has been in force for over a year. The new receivership will prevent any non-consenting creditors from seeking to embarrass the Reorganization Committee by bringing attachments in Maryland.

New Stations and Shops.

The Berlin Iron Bridge Co., of East Berlin, Conn., has received the contract for a new electric light and power station for the Bradford Electric Light & Power Co., at Bradford, Penn. The building is 65 ft. x 160 ft., with brick side walls, the roof being of iron, covered with the Berlin Company's corrugated iron roof covering.

Interlocking.

The Johnson Railroad Signal Co., has taken the contract for furnishing interlocking switches and signals at Kinder, Ill., on the line of the Terminal Railroad Association of St. Louis.

Chicago Main Drainage.

The bids on the \$3,000,000 issue of 4 per cent. bonds on the Chicago Sanitary District were far from satisfactory to the Drainage Trustees, there being but two bids received, neither one of which conformed to the advertised conditions. One bid was for but \$25,000, while the other was for the whole issue of \$3,000,000 at a discount of \$180,000, or a discount of 6 per cent. with the stipulation that the bonds must be payable in gold. Both bids were rejected. The board has not yet decided upon its further action in the matter. The report of the Superintendent of Construction for the month of May shows that sections N and O have been let. These two sections connect the sections formerly let with the Chicago river at Roby street, and place the entire Main Channel under construction except about 4,000 feet at the lower end. The total amount of material removed on the Main Channel during the month was 4,560,194 cubic yards of glacial drift and 2,505,300 cubic yards of solid rock. On the River Diversion 1,107,449 cubic yards of glacial drift and 221,183 cubic yards of solid rock were removed. The expenses for the month of May amounted to \$398,514.65, of which \$383,779.43 were paid to contractors, the pay rolls being \$12,891.44, and the material purchased amounting to \$1,843.78. The work done during the month averaged 89.21 per cent. of the monthly requirement.

The Smith Three-Cylinder Engine.

In the *Railroad Gazette* of December 30, 1892, a description was given of a method of using three high-pressure cylinders on a locomotive, patented by Mr. John B. Smith, President of the Erie & Wyoming Valley Railroad. A locomotive had just been put into service on that railroad with three 15-inch cylinders. Two of the cylinders were outside, arranged as usual, and the third was placed just inside the frame, on one side, working on a crank in the main driving axle. The crank pins and crank were placed at angles of 120 degrees. The valves were all placed above the cylinders as usual and worked by rock shafts, links and eccentrics. The whole arrangement was very simple, involving little change from ordinary practice and few extra parts. A separate blast nozzle was provided for each cylinder.

The success of this engine was such that a consolidation engine was afterwards changed to three cylinders and has given entire satisfaction; in fact it is said to be the most powerful engine on the road for its weight. The company is now rebuilding another consolidation engine, has put in three cylinders, and has ordered three mogul engines from the Baldwin Locomotive Works, also to have three cylinders. The engines being built by the Baldwin works will weigh 104,000 lbs. on the driving wheels, drivers to be 57 in. diameter, total wheel base 21 ft. 8 in., driving wheel base 14 ft., to burn culm with Wootton firebox. The cylinders are to be 17x24 in. and the working pressure 150 lbs.

The East River Tunnel.

Last Monday a party of gentlemen was taken through the East river tunnel by way of a formal opening in celebration of the event of the joining of the headings from the two shores. This tunnel is designed to carry illuminating gas from Long Island City to New York. It is 2,516.4 ft. long and 8 ft. 6 in. high and about 10 ft. wide, on its axes, there is a slight descending grade from New York. The tunnel is reached by a vertical shaft at either end, the one on the New York end being 135 ft. deep and that on the Long Island City end 147. The tunnel was constructed by the New York & East River Gas Co., Emerson McMillan, President and Charles M. Jacobs, Chief Engineer; W. I. Aimes and J. B. Davies being assistant engineers. The contractors were McLaughlin & Reilly. The tunnel passes directly under Blackwell's Island and the water above it in the New York tunnel is 65 ft. deep and in the Brooklyn tunnel 30 ft. The least roof is 40.93 ft. on the New York side and 82.23 on the Long Island side. Where soft material was encountered the tunnel is lined with iron and the work was done under air pressure. At the meeting of the headings the error in alignment was found to be $\frac{3}{4}$ of an inch.

The Halstead Street Lift Bridge.

We learn through press despatches that Mr. Waddell's famous lift bridge at Halstead street, Chicago, met with a little accident on the night of the 16th which made it im-

possible to move the bridge for many hours. This bridge was fully described in the *Railroad Gazette* of Feb. 24, 1893, and since then has been described in several of the technical journals. It crosses the south fork of the Chicago river, and is unique in that the whole bridge span, 130 ft. long, is lifted, to give 155 ft. in the clear above the water level. At either end is a tower about 200 ft. high above water level and each carries at its top eight pulleys 12 ft. in diameter, over which pass the wire ropes which raise the bridge. These cables are wound on 6 ft. drums with spiral grooves. The accident is said to have arisen from the breaking of a gear wheel just as the bridge had been lifted to its extreme height. Five men who were on it at the time stayed there all night, being afraid to descend by the tower ladder. One man did get down this way.

Another Fast Cruiser.

Last Saturday the new United States cruiser Minneapolis had a speed trial over a measured course of 44 miles and made the great average speed of 23.073 knots an hour, equal to 26 $\frac{1}{2}$ land miles. By the contract the builders get a bonus of \$50,000 for each quarter knot over 21. The premium earned is therefore \$414,600. This makes the total cost of the ship \$3,204,600. This speed is the official record after corrections for the influence of the tide, and the Minneapolis is the fastest ship of her size afloat. She, like her sister ship, the Columbia, has triple screws. Her displacement is 7,350 tons, indicated horse power about 21,000, length 412 ft., beam 58 ft., draft 22 $\frac{1}{2}$ ft. She has a coal capacity for about 13,000 miles steaming.

THE SCRAP HEAP.

Notes.

The Fitchburg Railroad announced that the date for running its trains to and from the new Union passenger station at Boston has been still further postponed. Besides the delay necessitated by the rearrangement of tracks and signals it is said that the baggage room accommodations are insufficient.

The Pullman Company's car shops at Ludlow, Ky., have started up with about 85 men at work. The Philadelphia & Reading has put 1,000 additional men at work in the car shops at Pottsville. The shops of the Pennsylvania Company at Logansport, Ind., have gone to work on full time, 800 men being employed.

A freight train of the Ohio River Railroad was boarded by about 275 tramps near Huntington, on July 13. The mob was dispersed by the police at Wheeling. A mob of 500 miners stopped a freight train of the Columbus, Hocking Valley & Toledo road at Nelsonville, O., July 12, and overpowered the 30 deputy marshals who were on the cars.

The people of South Enid, Ok., are still enraged at the Chicago, Rock Island & Pacific Railroad, and a charge of dynamite was exploded under a bridge on the morning of July 13. The report states that a freight train was wrecked and several men killed. A later despatch reports a similar occurrence in which the explosion did little harm. Government troops have been placed on guard at South Enid and Round Pond.

Press despatches of July 17 reported rioting as worse than ever at both Enid and Round Pond. The military guard was insufficient to keep order. Two more trestles were burned at Round Pond and trains could not be run.

A press despatch from Philadelphia states that a question between the Norfolk & Western Railroad and the coal operators in the Pocahontas region, concerning the price of coal, which had just been referred to arbitration at the time of the strike, was probably the reason why no strike took place in that region. It seems that the price paid to the operators by the Pocahontas Coal Co., which is controlled by the railroad, was high, and the negotiations were pretty sure to reduce it, but the reference of the matter to the arbitrators caused delay so that the high rates continued, enabling the mines to largely increase their output when nearly all other soft coal mines were closed. The railroad company has now withdrawn its consent to arbitration on the ground that the delay will be intolerable.

The International Railway Congress.

Since writing on this subject last week we learn that the Chesapeake & Ohio has joined the Congress. The list of American railroads now members, therefore, is the Pennsylvania, the New York Central, the New York, New Haven & Hartford, the Chesapeake & Ohio and the Richmond, Fredericksburg & Potomac. These are good representatives surely, but the list is a short one compared with what it ought to be. If our railroads have no higher motive they ought at least to join for the sake of the advertisement. Most of them like to have European travelers in this country know about their railroads; particularly the Trunk Lines from the seaboard and the great lines leading westward from Chicago and from St. Louis. They could not do any cheaper advertising.

The Alton Contract with the Wiggins Ferry.

The Supreme Court of Missouri has rendered a decision in one of the long pending suits of the Wiggins Ferry Co., of St. Louis, against the Chicago & Alton Railroad and it is in favor of the railroad. About 1872 the railroad company contracted with the Ferry Co., to carry freight and passengers across the Mississippi at St. Louis. After the bridge was built, part of the business was transferred to that and the Ferry Company entered suit, on the ground that the road had agreed to send all its business by the ferry. The court holds that this construction cannot rightfully be placed upon the contract. According to the press despatches the contract says that "no other than the Wiggins Ferry" shall be employed, but it is held that this means no other ferry; the prohibition does not apply to such a different means as a bridge. A referee had assessed the amount of damages against the Chicago & Alton at about \$378,000. There are other suits pending.

The Chignecto Ship Railroad.

There seems to be a very good chance that work will be resumed on the Chignecto Ship Railroad connecting the Bay of Fundy with the Gulf of St. Lawrence, at an early date. Negotiations to that end have been going on in London since May, when a party of engineers and capitalists returned to England after an inspection of the work so far done, in company with Chief Engineer H. G. C. Ketchum.

Very favorable news was received in Nova Scotia last week by the local agents of the company, and the assurance is given that arrangements have been nearly concluded to provide the necessary capital to finish the railroad. The promoters of the enterprise will shortly submit a new proposal in regard to the completion of the work to the Dominion Government.

Fourteen Passengers Killed in Spain.

A passenger train, while going down a heavy grade on the Arcanda mountain, between Lezana and Bilbao, Spain, July 7, was derailed and fell down an embankment. Fourteen passengers were killed and fourteen injured.

Suez Canal Traffic.

In our issue of May 11, page 344, we published the figures of shipping and tonnage through the St. Mary's Falls Canal, and the Suez Canal for a series of years, including 1893. We give below a few additional facts compiled by *Transport* (London).

It is a significant fact, which ought not to escape attention, that the number and tonnage of vessels traversing the waterway are diminishing year by year (only since 1891). The net tonnage for the past year shows a decrease of 52,960 tons as compared with that of 1892, and of 1,039,709 tons as compared with that of 1891, while the amount of dues declined from 83,422,101 francs in 1891, and 74,452,436 francs in 1892, to 70,667,361 francs in 1893. The number of vessels which passed through the canal was 4,207 in 1891, 3,559 in 1892, and 3,341 in 1893, of which 3,217 in 1891, 2,581 in 1892, and 2,405 in 1893 carried the British flag. The percentage of British flags passing through the Suez Canal in 1893 shows a slight decrease as compared with the previous year, the figure being 72 per cent. as against 72 $\frac{1}{2}$ per cent., in 1892. The percentage of German and Italian vessels has remained nearly stationary, while the increase in that of French vessels is from 4.89 to 5.69, and of Dutch vessels from 4.97 to 5.33. In the years 1881-91 the annual net tonnage ranged from 4,136,779 tons to 8,698,777 tons, and the transit receipts from 51,274,352 francs to 83,422,101 francs, the average of the net tonnage being 6,179,848 tons, and of the transit receipts 63,459,028 francs. The mean net tonnage per vessel also rose from 1,517 tons in 1881 to nearly 2,292 tons in 1893, being 125 tons per vessel in excess of the previous year's total. In 1870 there were carried through the canal 26,758 passengers; in 1880 the number increased to 98,900, while in 1893 the total was 180,432, against 183,912 in the previous year. As a dividend earning concern the canal has a fair record. Over and above the 5 per cent. interest, equal to 25 francs, the shareholders received for 1892 a dividend of 74,068 francs, in 1891 87,138 francs, and in 1890 a return of 67,686 francs, while on the account of 1893 there has been distributed 27.50 francs, and the balance dividend will shortly be announced, which, looking to the falling off in dues, may possibly be less than that declared at the corresponding date of last year.

Where the Liability is Placed.

The destruction of railroad property in Chicago through mob violence raises the question of financial responsibility for the losses. An Illinois State law, covering this point, was passed in 1887. It was founded on the Pennsylvania law which was an outgrowth of the Pittsburgh riots, and which stood the test of the Pennsylvania courts. It has never been tested in Illinois courts. In substance it is as follows:

Section 1 provides that whenever any building or real or personal property, except when in transit, shall be destroyed or injured by a mob of twelve or more persons, the city, or if not in a city the county in which said property was destroyed, shall be liable for three-quarters of the damages sustained.

Section 2 provides for the form of bringing the action, and Section 3 provides that no damages can be collected when the damage was aided, sanctioned or permitted by carelessness, neglect, or wrongful acts of the person or corporation damaged. He cannot collect if he did not use reasonable diligence to prevent the damage.

Section 4 provides that the person owning the property destroyed may sue others in the city when the city shall be reimbursed for the three-fourths damages it paid.

Section 5 provides that the city or county may sue the rioters or other persons participating in the riot.

Section 6 provides that the claim for damages must be presented within thirty days after the damages and the suit must be brought within a year.

This liability for damage will, of course, when proved, have to be met by the tax payers of the community, among whom, very few, if any, of the strikers who have committed the damage are numbered. Thus, the strikers place upon the owners of property the treble burden of defending their chattels, the loss through a curtailment of business, and a loss through an increase in taxes to meet damages committed. However, the lesson will not be without its effect. Mob violence is only possible where there is more or less sympathy with the strikers.

More Pass Frauds.

We have had occasion recently to report several cases of pass frauds, and the past week has brought to light the doings of a scamp who has for several months been using the name of Mr. Frank S. Bond, the vice-president in New York, of the Chicago, Milwaukee & St. Paul road. The fellow goes under the name of "Dr." Cook, with many aliases, and was caught while applying to Mr. August Belmont, chairman of the Louisville & Nashville, for transportation over that road. He is now lodged in jail, and will be tried this week. He is an old swindler, and about two years ago, was sentenced to a long term of imprisonment in New York, but was pardoned by the Governor last Fall. Mr. Bond has found that applications have been made in his name for passes on the New York, Ontario & Western, the Fall River Line, the Lehigh Valley and Central New Jersey roads, and there may be others which have not yet been brought to his notice.

A word of commendation ought to be said in regard to Mr. Bond's action in making sure that the scoundrel would be placed where he would not trouble other railroad officers for some time. He was such an audacious and consummate swindler that Mr. Bond felt that it was well worth while to take the time to prosecute him and to do so has already had to give up a good portion of several days, and has yet to attend his trial. If all railroad officers were also willing to take the time to see that fellows of this kind with whom they may have to deal, were landed safely in prison, there would be less attempts at a mean kind of swindling.

Valuation of North Carolina Railroad Property.

The North Carolina Railroad Commission has just made a new assessment of the taxable railroad property in that State, making the total amount \$24,728,000, an increase of \$500,000 over the assessment of last year. With the exception of six miles of side tracks, the Wilmington, Newbern & Norfolk did all the track building in the State during the past year—151 miles. Fifteen miles of the Jamesville & Washington track was abandoned and torn up. One-half the increase of \$500,000 in the taxable value of the roads is for rolling stock. The Commission increases the valuation \$500 per mile on the Murphy Branch of the Western North Carolina road, which is a part of the Southern Railway (late R. & D.) system; the Northwestern North Carolina road running from Greensboro to Winston, also a part of the same system, and the North Carolina end of the Roanoke & Southern road, running from Winston, N. C., to Roanoke, Va., a part of the Norfolk & Western system. The Commission declined to grant the request of the Wilmington & Weldon people for a reduction of the assessment on its side tracks. The assessed value of the steamship lines was made \$273,000, a decrease of \$25,000. Assessed value of telegraph lines, \$205,000.

Government Suit Against the Union Pacific.

United States District Attorney Denis, at Los Angeles, Cal., has filed in the United States Court a suit against the Southern Pacific and some 30 allied railroad companies, and the Pacific Mail Steamship Company, charging them with unlawful combination in restraint of trade and commerce, and requiring each company to operate its own lines through its own proper officers. The suit is brought under the Anti-Trust act of July 2, 1890. The suit, if successful, will compel every corporation now in the control of the Southern Pacific Company, of Kentucky, to operate under a separate and distinct management. The suit is in the nature of a petition in equity.

Petroleum from Sumatra.

Petroleum from the island of Sumatra, according to an item in the *Moniteur Industriel*, promises to become, before long, an important competitor of Russian and American oils. The oil districts are in the northern part of the island near the Straits of Malacca, and their yield is steadily on the increase. The wells are only a short distance from the coast, and the oil is said to be of superior quality and obtainable in large quantities. Franchises to develop the districts were granted by the Dutch Indies government some time ago to both English and Dutch capitalists, but up to the present time only the latter have carried on active work.

A New Breed of Train Robbers.

Thirteen men, victims of train robbers, are now at Homewood, Pa., with nothing left to wear but their shoes and underclothing. Saturday night they were all riding in a box car on the Fort Wayne road. While passing Geneva station, five armed men forced an entrance to the car, and, under threat of death, compelled the men to strip off their clothing. The robbers then threw out the clothing and jumped from the train. The victims claim to be union men en route to Cincinnati, where they had secured employment. Each man had a little money, and, in addition to all their clothing, they lost about \$100 in cash.—*Press despatch*, July 16.

Railroad Building in Siam.

Railroad building at the rate of 28 miles a year is considered reasonably rapid work in Siam. In January 1892, contracts were let for building the 165 miles between Bangkok and Korat; five years were given in which to complete the work, and at the end of two years it was estimated that about one-third of the work was completed. The work is done by coolies from China, and they generally run away at the first opportunity. The work is being done by an English company; the contract price is \$3,000,000. Several American firms made estimates on the work but could not compete at the figures named.

New Spanish Railroad.

The new direct railroad from Barcelona to Zaragoza, Spain, which was inaugurated on the 24th of May, was to have been opened to general traffic the end of June. The length of the line is 210 miles. There were many difficulties of construction, owing to the rugged country. There are seventeen tunnels, that of Argentera, 2½ miles in length, being the longest in Spain. There are six viaducts, and four bridges on the line, the bridge over the Elbro being a work of considerable magnitude.

"The Train Wire" on a Street Railroad.

A dispatch from West Chester, Pa., states that the new electric car line along the Lenape branch "will be operated by telephone." Wires have been strung and telephone instruments will be located at every turnout on the line.

The Palisade Tunnel.

The first passenger train went through the new tunnel of the New York, Susquehanna & Western Railroad, Co., under the Palisades Mountains at Fairview, N. J., on July 17.

LOCOMOTIVE BUILDING.

Three class "P" locomotives have been recently built at the Juniata shops of the Pennsylvania Railroad. These locomotives have 80 in. driving wheels and weigh about 125,000 lbs. each.

Three locomotives have recently been completed at the Ft. Wayne shops of the Pittsburgh, Fort Wayne & Chicago, for use on the western division. The locomotives are class "X" and have 5 ft. 8 in. drivers. Another locomotive is being constructed at the same shops and will soon be completed.

CAR BUILDING.

The New York, Susquehanna & Western has ordered 400 coal cars from Murray, Douglas & Co., of Milton, Pa.

The Jackson & Woodin Co. of Berwick, Pa., has received an order from the Delaware & Hudson Canal Co. for 150 coal cars.

BRIDGE BUILDING.

Columbia, Minn.—At a meeting of the Park Board held July 12, plans and specifications were examined for an iron bridge over the "Soo" railroad right of way in Columbia park. The following bids were opened: Milwaukee Bridge Co., plan A, \$1,489; plan B, \$1,097; Wrought Iron Bridge & Iron Co., Canton, Ohio, \$1,242; Wisconsin Bridge & Iron Co., No. 2, \$1,240; Gillette-Herzog Mfg. Co., plan No. 1, \$1,497; plan No. 2, \$1,397; Rinker & Hoff \$1,595. Upon recommendation of Engineer Pike the plan of Rinker & Hoff was accepted.

Hastings, Minn.—The contract to build the high wagon bridge across the Mississippi river at this point has been

awarded by the city council to the Wisconsin Bridge & Iron Co., of Milwaukee, at \$39,050.

Port Stanley, Ont.—The bridges on the London & Port Stanley Railroad, spanning Kettle Creek, will be rebuilt.

Reading, Pa.—Last week the county commissioners opened six bids for the construction of the superstructure of the steel bridge over the Perkiomen River at Klotz's Mill, but rejected all because they did not comply with the specifications.

Red Wing, Minn.—Tenders have been received for building the steel superstructure of the wagon bridge across the Mississippi river, and the contract will be awarded in a few days.

Scranton, Pa.—Plans for the new city bridges, for which a debt of \$250,000 was voted at the October election, are now prepared. The bonds to cover the above loan will, in all probability, be sold before the end of this month.

Scranton, Pa.—Now that the matter of erecting a viaduct at West Lackawanna avenue has been dropped, it has been proposed that a suspension bridge be constructed over the Delaware & Hudson, Central of New Jersey, New York, Ontario & Western and Delaware, Lackawanna & Western and the river.

Shadeville, O.—The Franklin county commissioners have under contemplation a new bridge over the canal near Shadeville, the old structure having failed. It was 56 ft. long, and the new bridge will cost about \$2,000.

Toledo, O.—City Engineer Miller says that no plans will be prepared for the new bridge over Swan Creek at St. Clair street, bidders being required to submit their own plans. He is now at work on the specifications. The cost will be limited to \$25,000.

Tuckersmith, Ont.—Tenders are being received by Mr. S. Millie, clerk of Hensall township, for the building of Silver Creek bridge, length 45 ft.

MEETINGS AND ANNOUNCEMENTS.**Dividends.**

Dividends on the capital stocks of railroad companies have been declared as follows:

Burlington, Cedar Rapids & Northern, semi-annual 1½ per cent, payable Aug. 1.

Hancock & Calumet, 2½ per cent.

Huntington & Broad Top Mountain, semi-annual 3½ per cent. on the preferred stock.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Rutland, annual, Rutland, Vt., July 23.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Freight Claim Association will hold its semi-annual meeting in Buffalo, N. Y., on August 8. The headquarters will be at the Hotel Iroquois.

The Society for the Promotion of Engineering Education will hold its first annual meeting in Brooklyn, N. Y., from August 20 to 23.

The New England Roadmasters' Association, will hold its annual convention at the American House, Boston, Mass., Aug. 15 and 16.

The Western Railway Club meets in the rooms of the Central Traffic Association, Monadnock Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The New York Railroad Club meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York city, on the third Thursday in each month, at 8 p. m.

The New England Railroad Club meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October.

The Southern and Northwestern Railway Club meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The Northwestern Railroad Club meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The Northwestern Track and Bridge Association meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The Western Society of Engineers meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The Engineers' Club of Philadelphia meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The Boston Society of Civil Engineers meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The Engineers' Club of St. Louis meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The Engineering Association of the South meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The Engineers' Society of Western Pennsylvania meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The Technical Society of the Pacific Coast meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The Association of Engineers of Virginia holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The Denver Society of Civil Engineers meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The Montana Society of Civil Engineers meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The Engineers' Club of Minneapolis meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The Canadian Society of Civil Engineers meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The Civil Engineers' Club of Cleveland meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The Engineers' Club of Cincinnati meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The Engineers' and Architects' Club of Louisville meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The Foundrymen's Association meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

Boston Society of Civil Engineers.

A regular meeting of the Boston Society of Civil Engineers was held June 20, at 8 o'clock President W. E. McClintock in the chair, 67 members and visitors present.

Messrs. Albert S. Crane, of Newtonville, Mass., Loring N. Farnum of Boston, Louis Hawes of Wakefield, Mass., Horace J. Howe of Brookline, Mass. and Oscar H. Tripp of Rockland, Me., were elected members of the Society.

The President announced the death of Hiram Nevons of Cambridge, Mass., which occurred May 27, 1894, and a committee was appointed to prepare a memoir, consisting of Messrs. R. C. P. Coggeshall, A. F. Noyes and Dexter Brackett.

Mr. Freeman C. Coffin read a paper entitled "Tests of Cement Joints for Sewer Pipes." The paper was followed by a general discussion of joints in sewer pipes in which Messrs. F. P. Stearns, E. S. Dorr, H. H. Carter, H. D. Woods and others took part.

President McClintock then gave an account of the bicycle track recently constructed at Waltham Mass., and upon which the fastest mile has been made. The Society then adjourned to September 19, 1894.

Roadmasters' Association.

The Roadmasters' Association of America will hold their eleventh annual meeting in Tammany Hall, New York City, commencing at 10 a. m., September 11, and continue in session three days. After the first session remaining business will be transacted in the Broadway Central Hotel, which place will be the headquarters of the Association.

New England Roadmasters' Association.

The twelfth annual convention of the New England Roadmasters' Association will be held at the American House, Boston, August 15th and 16th, opening on Wednesday, the 15th, at 9.30 o'clock in the morning.

General Baggage Agents.

The convention of the American Association of General Baggage Agents, which was to have been held in Montreal on July 18, has been postponed on account of the strike.

PERSONAL.

—Mr. E. M. Herr will take the management of the Gibbs Electrical Company, at Milwaukee, Wis.

—Mr. Homer T. Dick, formerly purchasing agent has been appointed superintendent of the Ohio Southern.

—Mr. Charles A. Bernard has been appointed assistant general freight agent of the Cleveland, Akron & Columbus.

—Mr. Daniel C. Hickey, a member of the well-known railroad contracting firm of Brodhead & Hickey, died at Mount Vernon, New York, on July 13.

—Mr. Thomas Ridgedale, Canadian passenger agent of the Wisconsin Central, with office at Montreal, has resigned and the office will be abolished.

—Mr. P. B. Thomas, Superintendent of the Cahaba division of the Tennessee Coal, Iron & Railroad Co., at Blockton, Ala., has tendered his resignation, to take effect August 1.

—Mr. H. R. Flickwir, a civil engineer on the Norfolk & Western, at Radford, died at Moyer, Pa., on July 12. He was a brother of D. W. Flickwir, General Superintendent of the Eastern General Division of the Norfolk & Western.

—Dion Martinez, Civil and Mining Engineer, of Pittsburgh, Pa., has just returned from a successful business trip to the United States of Colombia where he obtained valuable gold mining concessions for a Pittsburgh syndicate.

—Mr. M. P. Morrissey, Traffic Manager of the Velasco Terminal has resigned, and the traffic department, as well as the offices of assistant general manager and treasurer, will be consolidated under the present treasurer, G. W. Angle, whose headquarters are at Velasco, Tex.

—Mr. Albert S. White, General Freight Agent of the Cleveland, Cincinnati, Chicago & St. Louis road has resigned, to take effect on August 1. Mr. White has held this office since January, 1892. He was before that time Assistant General Freight Agent for the company at Cincinnati.

—Mr. Robert Dudgeon, has been appointed Superintendent of the Minnesota Transfer Railway Co., to succeed D. M. Sullivan, resigned. For the past three years Mr. Dudgeon has been Chairman of the Terminal Despatch Association, and prior to that time he was agent for the Great Northern at Minneapolis.

—We congratulate Mr. G. W. Rhodes on his recent promotion. After firing for several days he was promoted to be conductor of a freight train. We do not dare record these steps under the department of "Elections and Appointments," for fear that now that the strike is over Mr. Rhodes will again be promoted back to be superintendent of motive power.

—Mr. A. L. Mohler has been appointed General Manager of the Minneapolis & St. Louis, and will probably succeed W. H. Truesdale, who has been elected Third Vice-President of the Chicago, Rock Island & Pacific. Mr. Mohler was formerly General Manager of the Great Northern and resigned that position several months ago to take a rest, he having been continuously engaged in roadbuilding for over a quarter of a century.

—Mr. P. E. Burwell has resigned as general superintendent of the Cumberland & Pennsylvania, the resignation to take effect July 30. Mr. Burwell entered the service of the company as master of road in 1867, and succeeded James A. Millholland, as general superintendent in 1877. He will be succeeded by Lewis M. Hamilton, who has been filling the position of assistant superintendent for a number of years. Mr. Burwell will remain in the employ of the company as consulting engineer.

—Mr. D. M. Sullivan, Superintendent of the Minnesota Transfer Railway Co., has resigned. Mr. Sullivan was appointed Superintendent on February 1, 1883, and has continued in charge of the institution, which is practically the freight-clearing house of the Northwest. At the time of his appointment he was Assistant Superintendent of the Chicago, St. Paul, Minneapolis & Omaha, and had for two years been fuel and tie agent of the company, and prior to that one of its roadmasters. Mr. Sullivan's railroad in the Northwest began on the St. Paul & Pacific, now a part of the Great Northern, 28 years ago. He was in the service of this company for 12 years, the greater part of the time filling the position of roadmaster.

—Mr. J. Herbert Bramwell died in Paris, July 13. He was a mining engineer well known in this country and abroad. He was born in England in 1846, but his parents came to the United States while he was very young and he grew up here and was graduated at the College of the City of New York. He afterwards took a degree as mining engineer at the Royal School of Mines, Prussia. On his return to this country he became mining engineer and chemist for the Dunbar Iron Works in Pennsylvania and was afterwards employed at various furnaces and iron works in like capacities. He built the Quinnemont Iron Works in Virginia and afterwards was Vice-President and Manager of the New York & Ohio Iron & Steel Co., at Ironton, O. More recently he has been closely identified with the development of coal mining in Southwestern Virginia and the town of Bramwell in the center of that region is named after him.

—The very serious and painful accident to Mr. H. W. Fuller, which he sustained in a train accident on June 30, still confines him to the City of Washington, the physicians refusing to allow him to be removed from his room. His condition is now more satisfactory and he will probably be moved to the mountains in a few days. The accident to Mr. Fuller occurred near Rapidan Station, Va. The Cincinnati Express, No. 1, ran into the side of a Richmond & Danville freight train at Rapidan Station, on account of the freight not being clear of the main track. Mr. Fuller was in the baggage end of the combination car, and seeing that the collision was inevitable made a spring for the iron hand rail running above the baggage car door, with the idea of swinging out and avoiding injury from falling trunks. He did not obtain a firm hold and fell to the track alongside of the train, fracturing both legs above the ankle. No one else on the train was injured except the mail clerk in the car next ahead, who sustained a slight injury. Mr. Fuller's physicians state there will be no trouble about saving his legs, but of course, he will be laid up for a long time.

ELECTIONS AND APPOINTMENTS.

Albia & Centerville.—H. Gabelman has been appointed General Auditor with headquarters at Marshalltown, Ia., vice E. S. Benson, resigned.

Chicago & Northwestern.—C. E. Bray has been appointed General Agent of the Passenger Department of this company, with headquarters at No. 2 New Montgomery Street, San Francisco, Cal., vice E. A. Holbrook, resigned. Mr. Bray's territory is the entire State of California.

Cleveland, Akron & Columbus.—Charles A. Barnard has been appointed Assistant General Freight Agent with headquarters at Cleveland, O.

Cleveland, Akron & Columbus.—R. L. Barrett, Chief Clerk in the office of the General Superintendent of the Buffalo, Rochester & Pittsburg, has resigned to become Chief Clerk to the Superintendent, and Purchasing Agent of this road and the Ohio Southern at Cleveland.

Columbia & Maryland.—The annual meeting was held at Laurel, Md., on July 10 and the following directors were elected: L. G. Haslup, Stephen Gambrill, C. H. Stanley, C. F. Shaffer, Jr., P. C. Gorman, Thomas G. Hayes and Senator Gorman. The officers elected were: Stephen Gambrill, President; Charles H. Stanley, Vice-President; G. W. Waters, Sr., Secretary; Senator A. P. Gorman, Treasurer.

East Louisiana.—The annual meeting was held at Covington, La., on July 12, and the officers elected were: President, John Poitevent; Vice-President, J. A. Favre; Treasurer, E. Martelli; Secretary, W. J. Poitevent.

Lehigh Valley.—W. S. Speirs, Assistant General Freight Agent at Chicago, has had his title changed to Western Freight Agent at the same place, the office of Assistant General Freight Agent being abolished.

Louisville & Nashville.—Gardiner M. Lane, of Boston, for many years a director of the Union Pacific, has been elected a director of this company.

Louisville, New Albany & Chicago.—The published announcement of the appointment of G. S. Brecount, to be Superintendent of Transportation, was an error. Mr. Brecount is Commercial Agent at Cincinnati, and was transferred to Indianapolis to take charge of the operating department temporarily, but has now returned to his regular duties.

Louisville, St. Louis & Texas.—Ridgely Cayce, Car Accountant, has been appointed Assistant to Atilla Cox, the Receiver.

Mexican National.—Baker Mangun has been appointed Division Superintendent at San Luis Potosi, Mex. Mr. Mangun has been Acting Superintendent of that division since last September.

Minnesota Transfer.—D. M. Sullivan, Superintendent, has resigned and Robert Dudgeon has been appointed to succeed him.

New York, Lake Erie & Western.—H. C. Barlow, who has been Division Freight Agent at Bradford, Pa., has been promoted to be Claim Agent of the road, with headquarters in New York City.

Oregon Railway & Navigation Co.—W. H. Hurlburt has been appointed general passenger agent in full charge of the passenger business. He was formerly general passenger agent of the Canada Southern.

Pittsburgh, Cincinnati, Chicago & St. Louis.—John R. Miller, General Superintendent has removed his headquarters from Columbus, O., to Chicago.

Pullman Palace Car Co.—Robert Butters of the City of Mexico has been appointed district superintendent at Ogden, Utah.

Seaboard Air Line.—The following appointments have been announced, in effect July 15: James Maglenn, Superintendent Motive Power, with office at Raleigh, N. C.; B. S. Shaw, Master Mechanic, with office at Raleigh, N. C.; D. W. Ballentine, Master Car Builder, with office at Portsmouth, Va.; W. J. Edwards, General Storekeeper,

with office at Raleigh, N. C.; S. G. Dickerson, Superintendent Transportation of the southern division (G. C. & N. Ry.), with office at Abbeville, S. C.

Sedalia, Warsaw & Southwestern.—Judge Richard Field of the State Court at Sedalia, Mo., has appointed Thomas F. Mitchum, clerk of the Pettis County Court, Receiver of the railroad, vice J. C. Thompson, resigned.

Sonora.—H. T. Richards, Assistant General Manager having resigned, J. A. Naugle, General Freight and Passenger Agent has been appointed Assistant General Manager in addition to his other duties. His headquarters are at Guaymas, Mex.

Wabash.—The general offices were moved on July 11, from the Commercial Building on Sixth and Olive streets to the Wabash Building, on Seventh and Chestnut streets, St. Louis, Mo.

Wagner Palace Car Co.—Frank A. Barzeni has been appointed Assistant District Superintendent of the Lake Shore district in Chicago. Israel A. La Croit, who was transferred to Buffalo one year ago as Assistant District Superintendent, has returned to his old position as agent at the Grand Central Station in New York City, and C. C. Cox, night agent at Buffalo, has been promoted to the vacancy caused by his transfer.

Wisconsin Central.—D. W. Janowitz, formerly District Passenger Agent of the Northern Pacific at Indianapolis Ind., has been appointed District Passenger Agent of this company with headquarters at Baltimore, Md.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Altoona & Phillipsburg.—On July 16, the line was completed between Houtzdale and Phillipsburg, Pa., where it connects with the Beech Creek road. Samuel Langdon of Philadelphia, who is President has started his mines in the Houtzdale Region at the 45-cent basis.

Amsterdam, Johnstown & Gloversville.—This railroad company was incorporated at Albany, N. Y., last week with a capital of \$400,000 to build and operate a standard gage steam railroad for 11 miles from the New York Central tracks at Akin, Montgomery county, to Gloversville. The directors are: David A. Wells, Lewis Veghte, James L. Northrup, Martin Kenedey, of Johnstown, N. Y.; Lawton Caton, James W. Green, Thomas G. Foster, John C. Allen, of Gloversville; Francis Morris, Willis Wendell, Cornelius Van Buren, of Amsterdam; J. D. Pliver, South Bend, Ind., and John McClement, of New York City.

Baltimore & Drum Point.—The work which was begun during the early part of the year on this railroad south of Baltimore has been again suspended. The company, however, is arranging to again put the work under way once more and the negotiations at this end which are now in progress promise to make sure the completion of the entire road within a year. The line has been graded for about 70 miles south of Baltimore, nearly all of this having been graded some years ago. The grade, however, is still in good condition. Van Aiken & Hayes, of Washington, did some work on the road this year and will probably have the contract to complete the line. D. H. Howell, of the Union Building, Washington, D. C., is the chief engineer.

Baltimore Northern.—It is reported that active work in building this railroad will be commenced during the summer. Surveys have been made from Baltimore to Delta, Pa., where the road will connect with the proposed York & Schuylkill, the Pennsylvania division of the project. The distance by the new line between Baltimore and York, the terminus of the York & Schuylkill, will be about 50 miles. The road is projected by John Henry Miller, William Gilmore and M. H. Houseman, of Baltimore. Their aim is to get a direct road from York to a point near Mount Carmel, Pa., where the mines of the Penn Anthracite Company, in which Mr. Miller is interested, are situated. The road was incorporated about six months ago.

Black River.—Colonel George A. Ayer, of Perkinsville, Vt., who is the chief engineer of this project, reports that he intends to let about 11 miles of the line which will bring it to Springfield, Vt., in mile section contracts before July 30.

Boston & Albany (Georgia).—During 1892 this railroad was built by the Quitman Lumber Co., for about 20 miles north of Quitman, Ga., a station on the Savannah, Florida & Western. Since then no work has been done on the line beyond the surveys to Moultrie, which is about 25 miles north of Quitman and thence through Colquitt county. The railroad now built is operated by C. W. Pidecock, as superintendent, and he writes that an effort will be made to do some work on the road this year and that perhaps 27 miles north of the present terminus will be built.

Calcasieu, Vernon & Shreveport.—Lock, Moore & Co., of West Lake, La., one of the important lumber firms of Louisiana, now operate about 15 miles of railroad under this name west from the Houston river in Southern Louisiana. The line is now being completed from the Houston river to Lockport and Westlake, which will extend the line about eight miles further.

Cammal & Black Forest.—Some work is being done on the construction of this railroad out of Cammal, Pa. The company was incorporated last March with R. M. McCullough, of Jersey Shore, Pa., as president, to build from Cammal to County Line Springs, about 15 miles. The survey has about reached the proposed terminus and the work has been started near Cammal with the company's forces.

Canadian Railroad Subsidies.—The Dominion Government has introduced in parliament a resolution granting the following subsidies to railroads projected or in course of construction:—Bracebridge & Baysville, for 15 miles from Bracebridge toward Baysville a subsidy not exceeding in the whole, \$48,000; Brockville, Westport & Sault Ste. Marie, the balance remaining unpaid of the subsidy previously granted not exceeding in the whole \$86,000; Tilsonburg, Lake Erie & Pacific for 16 miles from Port Burwell to Tilsonburg, not exceeding in the whole \$51,200; Brantford, Waterloo & Lake Erie for 18 miles from the town of Brantford to the village of Hagarsville or Waterford, or some intermediate point on the Canada Southern not exceeding in the whole \$4,790; St. Catharines & Niagara Central, for 34 miles from St. Catharines to Hamilton, representing a grant in cash of \$108,000; Montreal & Ottawa (formerly the Vandœuvre & Prescott) for 61 miles towards Ottawa, not exceeding in the whole \$118,400; Quebec Central, upon the completion of its line from a point between the Chaudiere River and Tring Station to a point on the International Railway near Lake

Megantiz, \$288,000; Joliette & St. Jean de Matha Railway Co. for 8 miles from St. Felix de Valois to St. Jean de Matha, Que., not exceeding in the whole, \$25,600; Lake Temiscamingue Colonization, for 50 miles from Mattawa to the crossing of the Kippewa River, also 15 per cent. on the value of a wooden truss bridge over the Ottawa River, not to exceed \$15,000 in all, in lieu of subsidies granted; also the balance remaining unpaid of the subsidy granted for the railroad from Long Sault to Lake Kippewa, a subsidy not exceeding \$3,200 per mile and 15 per cent. on the value of the bridges,—also a sum of \$1,750 additional per mile on the 50 miles from Mattawa to the crossing of the Kippewa River, not exceeding in the whole \$274,940; Great Northern Railway Co., for 30 miles from a point on the Canadian Pacific near Maskinonge or Louisville, toward the parish of St. Michel des Saints, on the River Matawa, in lieu of the subsidies granted to the Maskinonge & Nipissing Railway Company, not exceeding in the whole \$96,000; from St. Placide to St. Andrews, eight miles, a subsidy not exceeding, \$25,600; For a railway from St. Eustache to St. Placide, for 18 miles subsidy not exceeding \$57,600; For a railway from a point on the line of the Canadian Pacific in the County of Laval, towards St. Eustache, for 12 miles in lieu of the subsidy granted to the Carillon & Grenville Railway for 12 miles from St. Eustache to Sault au Recollet, a subsidy not exceeding in the whole \$38,400; For a railroad from the Parish of St. Remi, in the County of Napierville, to St. Cyprien, for 12 miles not exceeding in the whole \$38,400; Pontiac Pacific Junction for bridging the several channels of the Ottawa River at Culbute and West, a subsidy of \$31,500; Pontiac Pacific Junction Railway, for 7½ miles of railroad from Hull to Aylmer, not exceeding in the whole \$24,000; Pontiac Pacific Junction, for 85 miles from Aylmer to Pembroke, not exceeding in the whole \$73,172; To the Harvey Branch Railway Co. for three miles of railroad from the southern terminus of the Albert Railroad to Harvey Bank, not exceeding in the whole, \$4,046; For a railroad from a point on the Intercolonial Railroad near Newcastle or via Douglastown, to a point on the River Miramichi, opposite the town of Chatham, in the Province of New Brunswick, 6 miles, a subsidy not exceeding \$19,200; For a railroad from some point on the Joggins Railroad, near the Hebert River, to Young's Mills, in the Province of Nova Scotia, a subsidy not exceeding in the whole \$16,000; Woodstock & Centreville Railroad for a railroad from Woodstock to the international boundary between the Province of New Brunswick and the State of Maine, 26 miles, a subsidy not exceeding \$83,200.

Clearfield, Conemaugh & Western.—The engineers have completed the third survey and are now engaged running lines north of Vinco, Pa. This road is to extend from Belsena Mills, Clearfield County, to Johnstown, Cambria County. It will ultimately reach Clearfield some distance north of Belsena and pass through a valuable undeveloped timber and coal section. S. J. M. Conell, of Harrisburg, Pa., is President, and Samuel Brugger, of Fleming, Pa., is Chief Engineer.

Denver, Lakewood & Golden.—The contractors on the Tindale extension have to rebuild the portion of the roadbed washed out by the floods of last month. With the exception of this grade, which is situated within the limits of Golden, Col., and is about a mile in length, the roadbed is practically completed and is ready for the rails. To replace the destroyed portion the channel of Clear Creek will have to be changed for several hundred yards.

Denver & Rio Grande.—The Chandler Creek branch five miles long, which was washed out by the June floods, is to be repaired. To do so will cost about \$10,000. This branch reaches two important coal mines of Fremont county, the Western Fuel Co.'s mines at Chandler and the Bear Gulf mines of the United Coal Co. The Oak Creek branch was also badly damaged, but as the mines on it are not operated it will not be rebuilt at present.

Ebensburg & Black Lick.—Work was partially suspended last week because of the non-arrival of rails. The grading was completed July 7. About 100 men have been suspended. This is a branch of the Pennsylvania Railroad. Charles McFadden, of Philadelphia, is the contractor. The branch is about ten miles long from Ebensburg west to Black Lick. Track has been laid for over half the distance.

Grand Trunk.—A line is being built by this company from the Georgian Bay Line at Park Head, a small station near Warton, Ont., the terminus of that branch, east to Owen Sound, where it connects with the terminus of another branch of the Grand Trunk which starts from Orangeville, Ont. J. C. Boyd, of Simcoe, Ont., has the contract for the work which includes the building of about 13 miles of new railroad.

Kings County Elevated.—The extension of the Fulton Elevated road from Logan street, Brooklyn, to the city line, was opened for traffic July 16. The new portion of the elevated structure is from the former terminus of the road at Logan street along Eastern Parkway to Market street and thence to the city line, a distance of nine-tenths of a mile. The Phoenix Iron Company were the contractors for the iron work.

Lake Aioskawasting.—The proprietors and owners of Lake Aioskawasting, and the five thousand acres of land surrounding, situated on the Shawangunk mountains, have organized a stock company to construct a railroad from Gardiner and New Platz in Ulster County, New York, to the top of the mountain, where it is proposed by the incorporators to construct a large hotel as a summer resort. It is the intention to connect the new line with the Wallkill Valley Railroad at Gardiner and the extension of the New York, Ontario & Western Railroad at Napanoch (which is soon to be built), and which is the present site of the State Reformatory. The promoters of the proposed railroad are: Julius Schoonmaker and Mrs. H. D. Darrow, the executors of the estate of Elizabeth V. D. Schoonmaker, deceased, to whom the property belongs; Emanuel Metzger, Attorney, and Edwin P. Clark, of Kingston, N. Y., Charles T. Coutant, of St. Remy, N. Y., and a number of New York capitalists. Surveys have been made and the route selected.

Maine Central.—A branch road is being built from the Maine Central track in Swanville, Me., to the base of Oak Hill to accommodate the granite quarries at that place. It has been graded and is ready for the iron.

Mexican Railroads.—The concession held by the Chiapas Mining Co., Limited, of London, for the construction of a railroad from a point on the Teapa river, Tabasco, to Solosuchiapa, Chiapas, has been declared officially null and void.

The concession held by Mr. Francis H. Woodhouse for the construction of a railroad from a point on the Vera Cruz line between the stations of Guadalupe and Apizaco to the projected iron works at Zacatlan, State of Puebla, has been declared null and void owing to the failure of the concessionary to deposit the required guarantee within the stipulated time.

New Roads.—The promoters of the proposed railroad from Bar Mills to Limerick, Me., have completed the articles of association for the company, and meetings will be held in the villages along the line to promote interest in the enterprise. This is the project for which Jerry Mason & Son, of Limerick, Me., have agreed to subscribe over \$50,000.

Ohio River & Charleston.—A charter was secured in South Carolina last week for this company. The directors are John Goldthwait, of Boston; Samuel Hunt, of Cincinnati; R. M. Morse and C. E. Hillier, of Boston, and J. J. Collier, of Philadelphia. The Ohio river & Charleston is the new name adopted by the Charleston, Cincinnati & Chicago, under the reorganization, and a similar charter will be taken out in each of the states through which the line extends. The plan is to form a company under the laws of Tennessee, which will absorb the lines in the other states, and this company, it is understood, will be known as the Ohio & Charleston Railroad Company.

Pennsylvania Midland.—E. A. Tenny, the contractor, has a considerable force of men working near the Bedford county line, Pennsylvania. Another force is at work at Snowdrift's Gap, the point where the road crosses the Alleghenies from Bedford into Somerset county. Agents of the road have purchased 1,200 acres of land about four miles east of Buckstown for \$18,000 on which a town will be laid out. J. Murray Africa, of Bedford, Pa., is Chief Engineer.

Pittsburgh & Western.—This company and the Beaver & Ellwood are interested with several large manufacturing concerns about Pittsburgh, in a contract made on July 13, at Ellwood City, Pa., for the development of coal and limestone deposits by the building of a connecting road from South Ellwood to North Sewickley, Pa. Engineers have gone over the ground and made the preliminary surveys. H. W. Hartmon, President of the Beaver & Ellwood Railroad, states that the road will be completed as soon as possible. At South Ellwood connections will be made with the Pittsburgh & Lake Erie and above North Sewickley, with the Pittsburgh & Western main line.

Swift River.—Work was commenced on the final survey for the location of this railroad last week. This is a 20-mile road into a rich lumbering as well as farming district in northern Maine beyond the line of the Portland & Rumford Falls road.

Swift River.—Edward Plummer of Lisbon Falls, Me., and Hon. Waldo Pettingill are at Rumford Falls making arrangements to begin the survey for the final location of this railroad up Swift river from a connection with the Portland & Rumford Falls, and it is expected that construction work will be in progress this month.

Toledo & Ohio Central Belt.—This road won the suit in the courts at Columbus this week giving it the right of way for about one mile of its survey for the proposed belt line around that city. One other suit in the Probate Court, involving a short strip of ground, remains for damages to be assessed. Other rights of way over the proposed route have been bought on an agreed price fixed on the same, so that the beginning of active work cannot be far off.

Virginia Western Coal & Iron.—The name of the railroad company formerly known as the Abingdon Coal & Iron Railroad has been changed as above. The company's railroad property consists of a graded roadbed between Abingdon on the Norfolk & Western and Damascus, Va., near the Virginia state line, 15 miles. There are several trestles to build before the tracklaying will be commenced and this work it is intended to finish as early as possible and to have the road ready for operation during the year. Colin Campbell, of New York, is the President of the new company, and J. C. Watson, Jr., of Abingdon, Va., is Chief Engineer.

York County.—The name York County Railroad has been selected by the directors of the proposed steam road from Portland & Rochester at Bar Mills to Limerick, Me. This is the project in which Jerry Mason & Sons of Limerick are largely interested, and to aid which they have agreed to subscribe over \$50,000.

GENERAL RAILROAD NEWS.

Alabama Great Southern.—The Central Trust Co., of New York, advertises for sale, on August 22, the stock of the Alabama Great Southern Railway Co., Limited, which was deposited with it as collateral under the Cincinnati extension mortgage. This sale will convey the title to a controlling interest in the Alabama Great Southern and the Cincinnati, New Orleans & Texas Pacific Companies. It is reported that a syndicate will purchase the property in the interest of the Richmond Terminal reorganization.

Atlanta & Florida.—Judge Clark of the State Court at Atlanta, Ga., has granted an order dissolving the injunction and dismissing the receiver for the railroad. The receiver was appointed at the instance of the American Trust & Banking Co., and was dismissed because no other creditors joined in the request. Capt. T. W. Garrett, now Superintendent of the road who was formerly receiver, was appointed receiver under the recent order, but the claims on which the order was issued were satisfied, and the receivership then vacated.

Cape Fear & Yadkin Valley.—A hearing of the motion of counsel for the North State Construction Co., for the removal of Gen. John Gill, as Receiver of the Railroad, or for a co-receiver, came up at Greensboro, N. C., on July 18, before United States Circuit Judge Simonson.

Charlotte, Columbia & Augusta.—This railroad and the Columbia & Greenville road of the Richmond & Danville system, were sold on July 10, under decree of the Circuit Court of the United States. Each road was bid in at \$100,000 by Samuel Spencer, president of the Southern Railway Co., the purchasers to carry out the terms of the reorganization plan.

Chicago, Peoria & St. Louis.—An order has been issued by Judge Allen of the United States court, in Illinois, authorizing C. H. Bosworth, receiver of the Chicago, Peoria & St. Louis Road, to lease that road to the North and South Company, between Springfield and Mount Olive. This line is 50 miles long and is leased to fill the gap occasioned by the release of the Jacksonville, Louisville & St. Louis from the Chicago, Peoria & St. Louis system.

Choctawhatchee & Railway Co.—George H. Earle, Jr., chairman of the Reorganization Committee, announces that the holders of about 80 per cent. of the debts of the company have assented to the plan of reorganization, and the subscriptions of those who have not assented have been underwritten. Securities and stock must be depos-

ited by Aug. 12. The committee calls attention to the fact that the creditors and stockholders of the company are required by the terms of the plan to give their assent before July 21.

Denver, Leadville & Gunnison.—A receiver for this railroad has been asked for by the New England Trust Company, of Boston, the trustee of the first mortgage.

East Tennessee, Virginia & Georgia.—United States Circuit Court Judge Lorton has confirmed the sale of the East Tennessee, Virginia & Georgia Railroad to the Southern Railway Company. The price paid was \$17,000,000. This will make the total mileage of the Southern 8,400.

Kansas City, Pittsburgh & Gulf.—The Arkansas Construction Co., builders and promoters of the Kansas City & Gulf Railroad, decided at a meeting in Kansas City last week to increase the capital stock of the railroad company from \$1,000,000 to \$5,500,000. The purpose is to extend the line from Siloam, Mo., to Shreveport, La., about 400 miles. The line is now in operation from Kansas City south to Siloam Springs, Ark., 230 miles.

Kansas Pacific.—Foreclosure proceedings have been begun in the United States Circuit Court against the Union Pacific Railroad Company by Russell Sage and George J. Gould, trustees for the bondholders of the Kansas Pacific Railroad Company, which is now a part of the Union Pacific system. The property covered by the bonds is the old Kansas Pacific, extending from Kansas City to Denver, and from Denver to Cheyenne. The bonds, amounting to \$11,724,000 were issued by the Kansas Pacific, May 1, 1879.

La Porte, Houston & Northern.—An application has been filed with the railroad commissioners of Texas for permission to issue \$15,000 per mile in bonds on 22 miles of roads, from Houston to La Porte. Thirteen miles of the road have already been completed, at a cost of \$116,285, exclusive of rolling stock and equipment.

Louisville & Nashville.—The directors of the Railroad Company have decided to pass the dividend on the net earnings for the year to June 30. The gross earnings for the last fiscal year were \$18,960,877, the smallest amount since 1890. In 1893, the gross earnings were \$22,403,639. The percentage of operating expenses to earnings was only 62.31 per cent., against 64.20 in 1893. The net earnings show a loss of \$873,688 from 1893. The income from other sources fell off \$75,352, making a total reduction in revenue of \$1,123,021. In 1892 the company paid a 4 per cent. dividend, and in 1893 it paid 4 per cent. There has been no dividend since June 30, 1893.

Mexican Southern.—The London shareholders of the railroad have accepted the report of the Directors, favoring the reduction of the interest payable in cash to 3 per cent., formerly 6 per cent.

Milwaukee Belt & Terminal.—A mortgage has been filed in the office of the Register of Deeds in Milwaukee by this Railroad Company to raise the sum of \$2,500,000 by an issue of five per cent. 50 year bonds to carry on the construction. The mortgage is given to the Union Trust Co. of New York.

Montgomery & Eufaula.—The Farmers' Loan & Trust Co., of New York, has secured a judgment against the Railroad in Alabama, for \$1,640,000. That amount represents the principal and interest, since July 1893, on \$1,500,000 bonds.

Oregon Short Line & Utah Northern.—The agreement of the first mortgage bondholders of the Company, under which joint action is proposed to be taken with a view to enforcing the lien of the mortgage and the guarantee thereon of the Union Pacific, has been completed and filed with the Central Trust Co. of New York. The committee is composed of R. C. Martin, John Bigelow, Cyrus J. Lawrence, Bernhard Mainzer and Gordon Abbott.

Sandy River.—This company has given a mortgage to the Maine Trust & Banking Co. of Gardiner, to secure \$200,000 of bonds issued by the company to discharge outstanding bonds to the amount of \$100,000 and outstanding scrip to the amount of \$100,000.

Savannah, Americus & Montgomery.—The Committee of Bondholders of the railroad have decided to apply to the court for an order to sell the road under foreclosure of the mortgage.

Washington & Chesapeake Beach.—July 26 has been set as the date for hearing the application made by Coffin, Sullivan & Co., of New York, contractors, for the appointment of a receiver to wind up the affairs of the Railroad company.

TRAFFIC.

Traffic Notes.

Two hundred shingle mills were shut down in the state of Washington in consequence of the stoppage of traffic on the railroads.

Severe competition between the Atlantic Steamship lines has reduced the rate for steerage passage from New York to Liverpool to \$10, including a steerage outfit and bedding.

A bill to bring the management of sleeping and dining cars under the interstate commerce law has been introduced in the Senate at Washington by Mr. Davis of Minnesota.

Shipments of coal over the Norfolk & Western continue heavy. Nearly 50,000 tons were delivered at Norfolk last week. Large quantities of coke for the west accumulated on the road on account of the blockades due to the railroad strike.

The Southern Railway and Steamship Association held a meeting at the Oriental Hotel, Manhattan Beach, N. Y., on Tuesday and Wednesday last. Restoration of freight rates on August 1 was agreed upon in a general way but no decisive action was reported at the time this paper went to press.

The Pocahontas coal shipped over the Norfolk & Western Railroad for the week ending July 7 aggregated 73,788 tons, an increase of 26,367 tons over the corresponding week of 1893. From Jan. 1 to July 7 the total shipments have been 1,814,312 tons, an increase over the same period last year of 121,285 tons.

Judge Taft, of the United States Court, at Cincinnati, has ordered the Louisville & Nashville to show why it does not obey the recent order of the Interstate Commerce Commission, reducing freight rates from the Ohio River southward. The order is returnable Oct. 2, but a temporary restraining order was also issued.

The Texas Railroad Commission has notified the railroads that it will begin fixing freight rates on cotton and cotton products, grain, hay and salt on July 23. The railroads also have been notified to file with the Commission-

ers all freight tariffs, state and interstate, local and joint, including division sheets, agreements, etc.

The project for a fast Atlantic Steamship service between Canada and England, including a subsidy from the Canadian government, continues to be a prominent topic in the Ottawa press dispatches, but the news still seems to have an unsubstantial air about it. On the other hand reports from London this week state that the postmaster-general, replying to a question in the House of Commons, says there is no prospect of the abandonment of the present mail route to Australia by way of New York and San Francisco.

Chicago Traffic Matters.

CHICAGO, July 18, 1894.

The roads are beginning to reorganize their clerical departments, which, in some cases, notably the Rock Island, the Chicago, Milwaukee & St. Paul and the Chicago & Northwestern, have been practically suspended during the strike. Freight is now being accepted by all the lines and the suburban passenger service has been practically restored. It will be some time before freight traffic resumes its normal proportions.

Traffic by lake is completely demoralized. The strike of the longshoremen created but passing notice for the reason that there was absolutely nothing that the boats could get in the way of freight and the most of the lines welcomed the opportunity to lay up their boats. It is said that the boats could not get even grain for ballast, and agreed rates were completely ignored in the scramble for what freight there was. Stocks in elevators here are probably 500,000 bushels short of what they were a week ago, but receipts this week will produce fair stocks. Flour and grain has commenced to move again and a marked improvement will be noticeable in this week's statement.

No material progress has been made towards a settlement of western passenger difficulties, nor will any further attempt be made until traffic resumes its normal condition. As regards the position of the western lines in respect to the competition of the Canadian Pacific on immigrant business, the situation appears to be about this: When the immigrant agreement was perfected, attempts were made to induce the Canadian Pacific to become a party. That line did not see its way clear to do so but agreed not to obstruct the operation of the agreement and to maintain the same basis of westbound rates and commission as was established by the western lines. The recent trouble with the Union Pacific caused a general overhauling of the eastern brokers, and it was found that some of them were not carrying out their contracts with the western lines to route their business via Chicago, but were turning a considerable share to the Canadian Pacific. Further investigation established the fact that the Canadian Pacific was violating its promise to the western lines and was offering the association brokers, better commissions than had been agreed upon by the association lines. When taxed with this, the Canadian Pacific defended its action by the claim that the brokers should give it a fair share of the business. The western lines took exceptions to this claim being urged as regards their brokers, who were under contract to turn their business via Chicago, but had no objection to the Canadian Pacific getting all the outside business it could at agreed commissions. Further, the association lines claimed that to allow the claim of the Canadian Pacific would virtually be allowing them a division of the business, while not members of the agreement. The western lines were willing to take the Canadian Pacific into the agreement, but it refused to be a party until the existing differences regarding North Pacific Coast business via St. Paul were settled. As this settlement depends upon action of lines not members of the association, no assurances can be given that it will be done and the western lines propose to meet any action taken by the Canadian Pacific, but will act in a conservative manner.

The Lehigh Valley is seeking to recover a considerable amount as terminal charges on immigrant business from the Burlington. Under a ruling of the immigrant clearing house, the Burlington declines to pay as the agreement provides that no terminal charges or commissions are to be paid to American roads except such as are authorized by the agreement itself.

The Kansas roads are looking forward to an enormous tonnage of corn this fall. Some roads estimate the present crop at 275,000,000 bushels. If this proves true it will be the largest crop ever hauled out of that state.

Very little is heard about the percentage divisions of the eastern lines. This is taken to be evidence that the agreement is working smoothly and that the roads are able to distribute the business without friction.

The Chicago eastbound roads have given notice that they will hereafter decline to absorb any part of the switching charges made by western roads or foreign connections on traffic from industries or side tracks on their lines within the switching limits of Chicago. Where the charges to different eastern lines are not uniform any line may equalize the actual difference if it so elects. Where freight originates at warehouses or industries located directly on the tracks of an eastern line, any other eastern line taking such freight may absorb the switching charge if it desires. Difference in switching shall not be equalized by cartage, nor difference in distance or location equalized by switching, nor shall the difference in location or distance be equalized by the payment of cartage. A charge of \$1 a car will be made on all live stock to and from the Stock Yards and vicinity, and a charge of \$2 a car on merchandise, except bonded freight, to and from the same territory. On bonded freight to the Stock Yards territory an additional charge of \$2 will be made, making the total charge \$4.

Eastbound shipments last week are interesting only as a matter of record. Five of the roads make no report, the inference being that no freight was moved.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending July 14, amounted to 4,142 tons, against 11,666 tons during the preceding week, a decrease of 7,522 tons and against 50,257 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	W'k to July 14.		W'k to July 7.	
	Tons.	P. C.	Tons.	P. C.
Michigan Central.....	792	19.1	1,774	15.2
Wabash.....	10.0	0.0	1,277	10.9
Lake Shore & Mich. South.....	683	16.5	1,665	14.3
Pitts., Ft. Wayne & Chicago.....	570	13.8	1,171	10.0
Pitts., Cin., Chicago & St. L.....	1,991	48.0	1,190	10.2
Baltimore & Ohio.....	0.0	0.0	52	.5
Chicago & Grand Trunk.....	0.0	0.0	1,084	9.3
New York, Chic. & St. Louis.....	0.0	0.0	1,338	11.5
Chicago & Erie.....	0.0	0.0	2,115	18.1
C. C. C. & St. Louis.....	106	2.6	0.0	0.0
Totals.....	4,142	100.0	11,666	100.0

Of the above shipments 23 tons were flour, 294 tons grain and mill stuff, 1,723 tons cured meats and 1,435 tons dressed beef.